Chesapeake Bay Program
Plastic Pollution Action Team
Web Meeting #10
April 19, 2023
1:00 PM – 3:00 PM

Meeting Materials

This meeting was recorded for internal use to assure the accuracy of meeting notes.

****

Meeting Summary

Attendance

Matt Robinson (DOEE - Chair), Kelly Somers (EPA - Vice Chair), August Goldfischer (CRC/NOAA - Staffer), Marty Gary (PRFC), Adrienne Kotula (CBC VA), Anna Kasko (MD DNR), Bob Murphy (Tetra Tech), Carlie Herring (NOAA), Christina Davis (ICPRB), Christine Knauss (UMCES), Donna Morrow (MD DNR), Fredrika Moser (UMD), John Levin (University of Maryland), Julie Lawson (CAC), Katie Morgan (NOAA MDP), Kristin Saunders (UMCES), Marc Moran (PA DEP), Mark Southerland (Tetra Tech), Mark Trice (MD DNR), Maurice Crawford (UMD), Michael Gonsior (UMCES), Nancy Roth (Tetra Tech), Paige Hobaugh (Tetra Tech), Rebecca Whiteash (PA DEP), Rob Hale (VIMS), Trey Sherard (Anacostia River Keeper), Doug Austin (EPA), Jeff Bednar (PA DEP)

Meeting Action Items:

- Anyone interested in self-nominating or nominating a colleague for the PPAT Chair position, fill out the PPAT Chair Nomination Form.
- Connections for Tetra Tech as they work on the microplastics monitoring framework and reference guide are welcomed (reach out to Bob Murphy at Bob.Murphy@tetratech.com).
    - References to review papers are also welcomed to build out the literature review, as well as suggestions of methodologies to include or to not include.
- Carlie Herring (NOAA) put Bob Murphy (Tetra Tech) in touch with points of contact at the International Joint Commission and University of Toronto who are working on a monitoring framework and risk assessment framework for microplastics in the Great Lakes.
    - Invite relevant presenters working on monitoring frameworks at the International Association for Great Lakes Research (IAGLR) conference to come to next PPAT meeting to talk about their approach.

01:00 Introductions

Kelly Somers (EPA Region III) – Action Team Vice Chair

Kelly Somers is filling in as acting Chair of the PPAT because Matt Robinson has stepped down as chair due to leaving DOEE for a new position with EPA. Matt will still play an active role in the PPAT. Nominations are currently being solicited for the Chair position.

01:05 Presentation: Impacts of Microplastics on Rainbow Trout in Aquaculture

Rob Hale (VIMS)

Summary: This recently published research examined the impact of multiple stressors and whether microplastic/virus co-exposure increases the disease susceptibility and mortality in rainbow trout. The disease examined was infectious hematopoietic necrosis virus (IHNV), which can cause 90% mortality in young fish and has been problematic in both wild and farmed populations of salmon and trout. The

types of plastics examined were nylon fibers, expanded polystyrene, and spartina as a natural polymeric material. The study was conducted in the laboratory, with groups of 20 fish exposed to either nylon, polystyrene, spartina, or no particle, and an additional set of groups with IHNV. The study found that microplastic exposure alone had low mortality rate, virus alone had a higher mortality rate, and the microplastics plus virus had the highest mortality rate, with nylon fibers having the greatest effect. The study found that nylon and polystyrene particles damage the gills which provides greater entry points for the virus into the fish. The study also found that microplastic particles must be present pre-exposure to the virus in order to have a detrimental effect. Exposure to nylon fibers is more impactful than exposure to nylon powder, and chronic exposure is more impactful than pre-virus exposure alone. Next steps are examining the effects of UV treatments on microplastics, and work is underway studying this.

Discussion:

- Matt Robinson (EPA): Any thoughts on impacts of microplastics and disease with Chesapeake species; for example, could this exacerbate wasting disease in striped bass? Are there other fish and other diseases you're concerned about?
- Rob Hale (VIMS): Yes. Patty Zuwalo did in vivo work looking at the immune system, looking at what microplastic exposure did to the immune system when microplastics get beyond membrane barrier. She saw impacts on the immune system. We're looking at the mechanism of transmittal across the membrane. Compromising the membrane by exposure to particulates enhances pathogen entry.
- Trey Sherard (Anacostia Riverkeeper): Aside from physically breaking the membrane, was there any assessment of co-contaminants with microplastics, such as PFAS or hydrophobic toxins?
- Rob: We didn't take plastics from the environment where they would have exposure to other toxins. We also analyzed those after the fact. The nylon was clean, the polystyrene was an insulation board that contained flame retardant. We did some work looking at leaching of that. We looked at aqueous leaching of all materials utilized and saw minimal leaching.

01:25 Presentation: Presence of Microplastics in Fish in the Anacostia and Potomac River, Washington, DC

Bob Murphy (Tetra Tech)

Summary: This project examined microplastics in fish in the tidal freshwater portions of the Anacostia and Potomac Rivers. Bob Murphy, Ryan Woodland (UMCES) and Phong Trieu (COG) led this project. Funding was provided by the EPA Region III Trash Free Waters Program and the Chesapeake Bay Program Office through a grant to the DC Department of Energy and Environment (DOEE). The researchers conducted earlier studies looking at whether submerged aquatic vegetation (SAV) beds concentrate microplastics. SAV beds serve as natural filters for sediment causing sediment to settle and accumulate within beds so SAV sediments were examined to see if they were sinks for microplastics. The researchers found significantly higher concentrations of microplastics in SAV bed canopies versus the adjacent open water column. SAV bed sediments were not found to be significantly higher in microplastics versus sediments outside of beds.

The more recent fish study examined patterns of ingested microplastics, both seasonal, geographical, types of plastics, and prevalence in several species across multiple trophic levels. Results: 23% of fish collected had microplastics in their stomachs, meaning they had ingested microplastics within 6 hours prior. There was a significant difference in microplastic abundance between feeding guilds. Invertivores had the highest microplastics per individual while planktivores had the least (in the stomach – not the complete digestive tract). There were also significant differences between seasons and regions for the planktivores and by season for piscivores. Types of particles found were mostly fibers with some

fragments and macroplastics. There were more microplastics and higher frequency of occurrence in higher trophic positions, while regional differences were only found in the smallest, least mobile taxa. Future work will examine microplastics found in prey items (such as mysid shrimp) for striped bass.

Discussion:

- Matt Robinson (EPA): Are there plans to conduct polymer analysis on leftover samples?
- Bob Murphy (Tetra Tech): Yes. We did have some analyzed already. I don't have all the data back yet.
- Rob Hale (VIMS): We recently received funding from EPA to look at emerging contaminants in sewer sludge. We purchased an agilent 8700 LDIR which is a rapid technology for measuring polymer types. What do you expect to be the lower range of detectability with regards to size of microplastics?
- Bob: It's limited to the GFC filter size which is 47 microns. It's the standard filter. We did not use any stains to pick up plastics that may have been more clear.
- Rob: On the LDIR we can get down to 10 microns. For polymer type, many people exclude rayon. Of course you can't have that option when you're doing visual identification, but things like rayon may be significant contributors to overall microplastic burdens.
- Bob: I agree. Without doing a polymer analysis it's visually indistinguishable from polyester fibers.
- Matt: Did you sort by color correct?
- Bob: We did. We had blue, black, red, pink, clear and green; but it was dominated by blue (50-70% blue).
- Matt: Might be interesting to compare your data to the data collected by Jesse Meiller at Georgetown University and Barbara Bolestra at American University who have been collecting microplastics in nontidal tributariers to the Anacostia. Jesse and Barbara have beenseparating their samples by color. There's also the Helcoski et Al. (2020) paper on microplastic accumulations in Kenilworth Aquatic gardens in DC. They did some sampling in mud flats, open channel and within the marsh itself and found high concentrations of microfibers. They may have sorted their samples by color.
- Kristin Saunders (UMCES): Based on these two presentations, do any ideas come to mind of policy changes? There's some filtration devices you can put on washing machines that limit the amount of fiber leaving your laundry session. I don't know if there's an industrial scale one for wastewater treatment centers.
- Bob: Hampton Roads Sanitation District applied a high-tech quaternary treatment to do just that (i.e. SWIFT Program).
- Rob: BK Song and Chris Burbage at VIMS are both working on the SWIFT Program. They have an extended suite of treatments and had substantial microplastics reduction.
- Matt: I've heard of people using bags to wash their clothes that capture microplastics, or washing machine inserts and filters that capture fibers.
- Carlie Herring (NOAA): The Rozalia Project sells a device known as a "Cora Ball" which captured microplastic fibers in washing machines.
- Christine Knauss (UMCES): Oregon is trying to pass a bill requiring washing machines to have filters (Senate Bill 405).
    - Mark Trice (MD DNR): NY Times Review of laundry filter options: https://www.nytimes.com/wirecutter/blog/reduce-laundry-microfiber-pollution/
- Michael Gonsior (UMCES): 95+% of microplastics end up in the sludge from waste water treatment plants and we should also think about where this sludge is being applied.

    - Rob: @ Michael – that is the focus of our EPA project.
- Matt: They found that on farm fields from sampling.
- Carlie: We are working ona report on microfiber pollution, which is being led by an interagency coordinating committee between EPA and NOAA. We're going through final revision rounds and a report should be out in the fall.

01:45 Research and Action Announcements
Meeting attendees will be invited to provide brief updates on plastic pollution research and management actions
Kelly Somers - Action Team Vice Chair

- Kelly Somers (EPA): Under the bipartisan infrastructure law there is more money than ever for Clean Water and Drinking Water state revolving fund (SRF) programs. There is a program for emerging contaminants, under which microplastics are listed. There are opportunities under the emerging contaminants portion of the SRF to get 100% principal forgiveness loans to purchase equipment, and planning, design and construction to build a microplastics lab. If anyone is interested in this funding I recommend that you reach out to your state SRF counterparts. I can also connect you with EPA SRF leads. Note that eligibility and priority are dictated at the state level. Questions for EPA can get coordinated through me: somers.kelly@epa.gov
    - FAQ Document
    - CW SRF state contacts
- DW SRF State contacts
- Christina Davis (ICPRB): Is that separate from the Small and Disadvantaged Community EC SRF program? Kelly: Yes.
- Kelly: EPA secured funding for two additional projects. We will be moving forward with a source tracking project looking at different land use types and microplastics, and also will be looking at a biological exposure project. The project we put in through GIT funding was the inspiration.
- Christine Knauss (UMCES): I presented back in September about the national network of research programs and having the PPAT be part of that. We heard back from NSF that we did not get the funding. We did get good reviews and will be submitting another application in fall 2023.
- Julie Lawson (CAC/DC DOEE): DC DOEE is partnering with University of the District of Columbia (UDC) for a study analyzing the impact of banning single use plastic bottles. There will be a panel in September and we'll keep you in the loop for that.
- Rebecca Whiteash (PA DEP): Working on proposal for microplastics study sampling wadable streams in PA. Study would look at stormwater run-off or discharges as being major sources of microplastics. Would likely take two sampling seasons to complete. Should provide enough information for source reduction policy and management approaches.
- Matt: Are there plans to conduct polymer analysis as part of this project or do you need additional resources to do that?
- Rebecca: Yes. I've been talking with a Penn State lab to analyze our samples using pyrolysis GC mass spec. I've been talking to EPA lab in Ohio about FTIR analyses. I'm open to suggestions on where I can have these analyses done.
- Matt: What's the inspiration for this in PA?
- Rebecca: For trash, our division is working on a trash collection protocol. For microplastics, my participation in these meetings and conversations about source reduction. When I take this info

back to my supervisors I don't know if I've explained well the microplastics issue, and a study like this would be able to speak to the issue statewide.

- Kelly: Talk to your clean water SRF folks. There might be opportunities for equipment gaps because it's an eligible expense under emerging contaminants SRF.
- Kelly introduced August Goldfischer (CRC) as a staffer supporting the PPAT.
- Adrienne Kotula (CBC): The Extended Producer Responsibility Report was released by the Commission back in November. The MD Delegation released legislation to start studying in their jurisdiction. It made it out of the House but not out of the Senate. However, there are other efforts ongoing. Please let the CBC know if you have any evidence to support the EPR policy efforts.
- Bob Murphy (Tetra Tech): I was invited to the MD Coastal Bays program scientific technical advisory committee. I presented the work of the PPAT with risk assessment and science strategy because it's very transferrable work. They are very interested in doing microplastic assessments in the coastal bays. They are looking at fish and mussels.
- Rob Hale (VIMS): VIMS was awarded a large EPA grant last year to get an LDIR to look at microplastics (and emerging chemical contaminants) during the wastewater sludge treatment process. We are interested in thermohydrolysis or CAMBITM processes – with it some treatment plants essentially pressure cook sludge to make it a Class A biosolid. Temperatures are used that are beyond the melting point of some microplastics which would alter their shape and size when that process is applied. VIMS also just hired Dr. Meredith Seeley as an assistant professor, and she is planning on purchasing a pyrolysis GC mass spec unit here, so we would have LDIR and pyrolysis GC mass spec capabilities. BK Song has a Raman microscope. We'll be building on our capability to analyze microplastics.
- Michael Gonsior (UMCES): Rob: Are you working with blue plains? They have a CAMBI system
    - Rob: We're working with Hamptons roads sanitation. They have a unit. There are about 4-5 systems in the US with a CAMBI system.
- Matt: Mark Trice and Chelsea Rockland published a paper with data on blue plains and fibers were the number one type of microplastics coming out of wastewater treatment plants in the Chesapeake.
- Kristin Saunders (UMCES): There is a potential nexus here with regard to sewage sludge/microplastics/PCBs and PFAS.
- Kelly: I agree. There is a nexus.

02:00 Monitoring Program
Matt Robinson (EPA Region III CBPO) and Bob Murphy (Tetra Tech)

Summary: A monitoring framework for microplastics was developed over the past couple years by a small sub-working group of the PPAT. This was developed based on the recommendations in the 2021 microplastics science strategy. Funding has been secured to build out the monitoring program, and Tetra Tech will be working on this. They will also develop a reference guide for sampling and analytical methodologies. A literature review will inform these guides to take existing methodologies and include any recently updated or refined methodologies. The monitoring framework will build off the monitoring matrix, which is a series of questions to guide monitoring goals. The monitoring framework will make recommendations on monitoring strategies based on parameters such as media, scale, frequency, key living resources, and many others. Next steps are to identify existing monitoring programs that include microplastics such as Prince Georges County, MD, and PA, and characterize their geographic coverage

and the questions/goals they are addressing. The PPAT will provide oversight and review throughout the process of developing the monitoring framework, which will be completed in June 2024.

Discussion:

- Kristin Saunders (UMCES): Where in the timeline do you foresee the PPAT review?
- Kelly Somers (EPA): When we put out a call for comments, we'll put the dates in. We'll want to know if this the most up to date approach out there. We'll want one or two iterations of review on the framework. Different categories like frequency, location, scale.
- Bob: The PPAT review would be a month to 6 weeks before the dates on the contract schedule.
- Mark Southerland (Tetra Tech): We have to come up with a feasible design. We want to leverage existing monitoring programs. In addition to CBP efforts there are state and local efforts. A few weeks ago, the MD water council had a round table. I asked that group, are you doing any microplastics monitoring now? None of them are except Prince Georges, but many are interested. Baltimore, particularly. Multiple programs being leveraged could give us cost effective design. Many of the water samples they take often are sent to the same labs. That's a central way they can talk to those folks. There were quite a few nonprofits interested, like the Patapsco heritage Greenway. This is something accessible to volunteer monitoring.
- August Goldfischer (CRC): Have you talked to the Chesapeake Monitoring Cooperative for opportunities to incorporate volunteer monitoring?
- Bob: Not yet, but they're on my list.
    - Action item: Connections are welcomed now for TetraTech to reach out to, although there's not a huge time crunch. This will be a talking point at future agendas.
    - Action item: References to review papers are needed. If you think of things you'd like to be included in the literature review, let us know. If you know methodologies that *don't* work well, please let us know.
- Carlie Herring (NOAA): The International Joint Commission and University of Toronto are working on a monitoring framework and risk assessment framework for microplastics in the Great Lakes. There could be some overlap and/or opportunities to learn from one another. I can put you in contact with the points of contact for that effort. They will also present on this project at the upcoming International Association for Great Lakes Research (IAGLR) conference (second week of May).
    - Action Item: Happy to follow up with point of contacts for that effort.
    - Bob: Please include me on that.
- Action item: Invite people presenting at that conference to come to our next meeting to talk about their approaches.

02:30 Preparing for the Chesapeake Bay Program Biennial Strategic Review System Meeting
Kristin Saunders (UMCES)
Summary: Kristin reviewed the schedule for the Biennial SRS Meeting, the Executive Council Charge for Charting a Course to 2025 and beyond, and the Steering Committee structure for addressing this charge, broken into two working groups of until 2025 and beyond 2025.

- Matt: This is a good opportunity to make sure plastics get incorporated beyond 2025.
- Kristin: We have leadership that tends to say their focus will be the TMDL. However, we know there are plenty of others with a broader view.

- John Levin (University of Maryland): I'm a student at the University of Maryland writing a memo paper on plastic pollution and its effect on the Chesapeake Bay watershed. Where can I find more info on how Chesapeake Bay jurisdictions are mitigating plastic pollution from occurring?
- Matt Robinson (EPA): One place is the NOAA Mid Atlantic Marine Debris Plan. Another place is Virginia Coastal Zone management Marine Debris Reduction Plan, the DC DOEE Anacostia trash Reduction Strategy. There is also an EPA Mid-Atlantic Trash Free Waters plan. There's also information on the PPAT web page, including a STAC report.
- Kelly and Matt shared the PPAT Chair Nomination Form. You can self-nominate. Ask Kelly and Matt if you have any questions.

03:00 Adjourn