CBP Goal Implementation Team
Water Quality Goal Implementation Team
Toxic Contaminants Workgroup
All Day In-Person Meeting Minutes

Date: Wednesday, July 18, 2018
Time: 9:30 AM – 3:15 PM
Location: USGS Baltimore (5522 Research Park Drive, Baltimore MD 21228)
Calendar Page: Link

Agenda Item and Desired Outcome	Time	Background Docs, Notes, and Action Items
1. Welcome, introductions, relevant news and announcements	9:30	
2. Overview/Review of Decision Framework and Strategy Review System –Greg Allen Refresher on structure of CBP adaptive management-based strategy review system (SRS). Review of timeline and progress to date, including SRS quarterly progress presentation to Management Board (May 10, 2018).	9:40	Documents: • Decision Framework for management strategy • Overview Presentation • WQGIT/TCW SRS Timeline
3. Policy and Prevention Management Strategy and Work Plan Revisions –Greg Allen Detailed review of the draft revisions to management strategy and discuss revisions needed for workplan. Workgroup members should come ready to discuss their assigned tasks as responsible parties in the work plan. **Desired Outcome**: Workgroup consensus on draft final Management Strategy and items to revise in Work plan for Policy and Prevention Outcome	10:00	Documents: • SRS Logic Table –Policy and Prevention • SRS Guide – Policy and Prevention • SRS Presentation –Policy and Prevention • Summary of Proposed changes to MS and work plan • Draft Plan for Exploring the Feasibility and Value of a Chesapeake PCB Consortium
4. Lunch	12:00	
5. Fish Tumor Research in the Anacostia: Updates and	12:30	Documents:

Agenda Item and Desired Outcome	Time	Background Docs, Notes, and Action Items
Findings –Fred Pinkney **Desired Outcome:** Identify future research to be included in Research management strategy and work plan; identify trends and how they might inform future Policy and Prevention work plans		• Presentation • *(tentative)* Data summary/report
6. **Research Management Strategy and Work Plan Revisions –Scott Phillips** Detailed review of the draft revisions to management strategy and discuss revisions needed for workplan. Workgroup members should come ready to discuss their assigned tasks as responsible parties in the work plan. **Desired Outcome**: Workgroup consensus on draft final Research Management Strategy and items to revise for Research Work plan.	1:00	Documents: • SRS Logic Table --Research • SRS Guide -- Research • SRS Presentation –Research • Summary presentation of proposed changes to Research management Strategy and work plan • Mark-up of Research Management Strategy • Mark-up of Research Work Plan
7. Wrap Up and Review Decisions and Actions	2:45	
Adjourn	3:15	

Next TCW Conference Call: Wednesday, August 8, 1-3 PM

Summary of Actions and Decisions:

Policy and Prevention Management Strategy and Workplan:

Action: An additional gap for the Policy and Prevention Management Strategy may considered to acknowledge the quality and amount of PCB impairment data as a limiting factor in determining trends over time of PSC impairments.

Action: The TCW will consider whether identifying additional PCB impairment indicator data for potential trend analysis is appropriate for the PCB Consortium to address.

Action: A table of contents will be considered for addition to the management strategy for Policy and Prevention for navigational purposes.

Action: The jurisdictions will commit to review and update the sections for current efforts and gaps (EPA Region III; researchers in those areas; jurisdiction leads).

Action: Greg Allen, Michelle Williams and Doug Austin will lead on compiling and combining review and mark-ups of
the management strategy. However, all members are asked to review and assist with specific updates.

Action: Greg Allen and Michelle Williams will work to review and update the sections on local collaborations, cross-outcome collaboration.

Action: Greg Allen will update the Management Approaches in the Policy and Prevention management strategy to include the PCB consortium.

Action: The Science Management Approach will be re-formatted to reflect the following four focus areas:

1. Identify sources This would include all the source tracking efforts; and could include the modeling since that is one use of the modeling efforts.
2. BMP effectiveness This would be your mitigation topic and either title works for me. We could include work on reducing PCBs and how to put into CAST)
3. Status and change of environment conditions. This would address lab and field methods so they are comparable across the watershed; Item would also address "measuring progress item of the P&P strategy" to document if PCB concentrations are being reduced from the BMP efforts.
4. Synthesize and communicate results. Not sure if we need this as a separate item but could include working with WQ GIT work groups (WWTP and stormwater in particular).

Action: All members and jurisdictional representatives are asked to review and provide comments on the Policy and Prevention Management Strategy in two weeks, by COB August 1. Reviews, edits and comments can be sent to Michelle Williams (williams.michelle@epa.gov)

Research Management Strategy and Workplan:

Action: Scott Phillips and Emily Majcher will update the science Management Approach and section for current monitoring efforts.

Action: Michelle Williams will post the PCB Consortium discussion paper from the July 12 Management Board meeting to the July 18 TCW meeting page.

Action: Landscape-scale prioritization of research and management will be included in the Research management strategy and workplan, with less emphasis on risk assessment of individual contaminants. Further refinement of the stressor-based landscape-scale prioritization approach will occur in development of workplan items.

Action: Hg, fish consumption advisories, CECs, shellfish, will be included in Research management strategy, but will not include recreational activities or bacteria/pathogens in the Research management strategy or workplan.

Action: Harmful algal blooms may be considered an emerging issue for potential inclusion in the Research management strategy for more work in the future.

Action: Perflouro-alkyl substances will be considered for inclusion as contaminants of emerging concern in the Research management strategy.

Action: All partners asked to review the Research Management Strategy and workplan and provide comments and updates by August 1. Comments, feedback, and suggested revisions on the Research Management Strategy and workplan should be emailed to Emily Majcher (emajcher@usgs.gov) by COB August 1.

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1. **Intro and Announcements**
   - Scott Phillips emphasized the importance of this first revision of the management strategies and workplans, and need to update sections with new information and lessons learned.

2. **Intro and Review of SRS Process**
   - Greg Allen gave an overview of the mission, goals and outcomes for CBP, and two-year review process (metrics, workplans, management strategies, and SRS).

- August 8 is the deadline for getting MS and workplans out to public for input (at TCW August 8 conference call). Then we will have a month to review before final workplans and management strategies are published to Chesapeake Progress. This is a 120-day process, and the August 8 deadline is the 9-day mark where draft management strategies and workplans should be posted for public input. Presentation to the TCW on the August 8 TCW call will be sufficient as requirement for posting as public comment.
- Note that this is an adaptive management framework, and we always need to ask what have we learned and how we can apply what we've learned going forward.
- We want to end up with a set of notes and markups for review over next couple months, prior to the September 13 deadline.
- We will need to share the responsibilities for writing, updates, providing new information, and EPA Region III has input on PCB strategy.

3. <u>Policy and Prevention Management Strategy and Workplan</u>

- Some edits done in management strategy document itself.
- Follow up with Management Board included:
    - New factor influencing success: lack of jurisdictional cross-collaboration on PCB TMDL life cycle.
    - New management approach (PCB consortium): Need for a separate forum beyond the TCW to work on information sharing, advisory work, and facilitating progress on TMDL life cycle of PCB TMDLs. The PCB consortium document needs more review by the Management Board, but we will bring back to the Management Board for approval later, to explore if and how we might go about forming a consortium. We hope that Management Board feedback will come in next couple weeks. Management Board was concerned with potential resources (funding, staff time, meetings) that would be involved with the consortium.
- John Cargill: Does each jurisdiction already have a point-person for their PCB problem sources?
- Allen: We have one person from each state for the TCW from their TMDL groups, who could be approached with a request to participate or who could nominate someone from their jurisdiction to participate.
- Cargill: So we have a bank of people already who might be able to participate.
- Scott: The issue is that these people are already stretched, so we want to make sure we are able to support this additional participation in a consortium framework.
- Greg reviewed the highlighted potential changes: Updates from jurisdictions and EPA on PCB impairments and TMDL status; updates needed to management approaches; air monitoring updates; regulatory approaches and jurisdiction monitoring updates.
    - Are there updates to monitoring and other information? For instance, is Upal Ghosh able to add updates in air monitoring work with UMBC?

- John Cargill suggested developing indicators and trends for other contaminants that we might want to manage.
    - Scott: We might be able to do that in the context of the research workplan.
    - Allen: Let's follow up later to see if there are other contaminants in the Research strategy that may be appropriate to consider now in the policy and prevention work, for instance PAHs.

I: Goals, Outcome and Baseline (Baseline and Current Condition):

- Fred Pinkney asked if we have trends of impairment coverage over time?
    - Allen: We have several updates to the indicator map since 2010. It's gone from about 70% impairment of tidal segments to 80% impairments over time (full or partial coverage). We can't say whether it's an indicator of condition or trends for PCBs, or whether there is just more data out there over time.
- Pinkney: But perhaps it indicates changes in concern, if there are more resources being put to PCB monitoring that leads to more data in the map. Currently to my knowledge, the states have some data but the sample sizes are too small for statistical analysis. But maybe there is trend-able data out there.
    - Upal Ghosh: There is some trends we can look at, but I agree with Fred, that if you tried to do statistical analysis, it gets tricky because the sample sizes are so low.
    - George Onyullo: We need to consider how we will use data when we request that. It's a hard statement to defend to say the impairments are extensive but that we don't have enough data to do trend analysis to support that statement.
    - Allen: The question is whether we have enough data and then whether we can do trend analysis on what's available. That may be one task that the Consortium could take on.
    - Scott Phillips: The extensive impairments are more of an indication of current status, not information on how those impairments are changing over time. Perhaps that is a science piece, to assess whether there is data there where we could see trends over time.
    - Allen: That quality of data and whether it is trendable might be a gap that we could identify and consider how that could be addressed—perhaps under the science management approaches.

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Action: The TCW will consider whether identifying additional PCB impairment indicator data for potential trend analysis is appropriate for the PCB Consortium to address.

- Greg Allen introduced the factors, and asked for potential updates to beginning sections, including *Participating Partners* and/or *Local Engagement*. For instance, under local engagement, we could add some discussion of the Baltimore Urban Waters Partnership.

III Factors Influencing:

- Blomquist: The factors are all things that tend to inhibit our ability to manage of PCBs. Are there things that make PCBs easier to work on, for instance their tendency to work well as source targeted contaminants unlike non-point source contaminants/pollution.
    - Phillips: Interesting thought. When these management strategies were developed originally, we did consider factors more in the context of what is hindering us rather than what is helping us.
- Phillips: If we are interested in expanding our focus to other contaminants besides PCBs, we should add a factor to address those contaminants?
    - Onyullo: Perhaps we can use the first bullet there to include the additional contaminants that Greg mentioned, like PAHs?
    - Cargill: What about from a monetary perspective? For instance, the incremental cost to analyze for other compounds might be an incentive to analyze for other compounds while you are out looking for PCBs to focus on multiple compounds.
    - Phillips: Maybe we should think about that for the research strategy.
- Joel Blomquist asked if we are considering human health risk in these contaminants.
    - Allen: We discuss ecological health more than human health in the context of the Bay Program.
- Lee Blaney: Are we looking at ecological health or a more ecosystem services approach, where the monetary cost of remediation is justified by ecoservices improvements?
    - Philips: I don't know if we capture that in the management strategy, but there is consideration of co-benefits and ecosystem services in the management and implementation work of the Bay Program.
- Allen: I think eco-services is more of a selling point, and we may not need that so much since we already have traction on this issue.

IV: Current Efforts and Gaps:

- TMDL regulatory efforts: Need jurisdiction assistance to review and update to ensure that it is accurate.
- Allen: We are back to the question of whether NY has impairments for PCBs (in Chesapeake Watershed), but we need to reach out to NY to confirm. We may also want to add more about other non-PCB TMDLs as progress is being made.
- Allen: We think we can add some discussion of the TMDL life cycle (from discussion of PCB resource center, and could frame work of PCB Consortium). There is some discussion here but this can be expanded.

- Onyullo: DC and EPA have already developed PCB TMDLs for the Potomac to cover Rock Creek, so that is an update that could be added to the management strategy.
- Scott Phillips noted that Page 6 – 20 goes though source sectors (stormwater, wastewater, so on). Suggestion to include a table with highlights rather than just straight text.
    - Allen: I like having the extended discussion, but perhaps we can add a table to the beginning that shows what all the highlights are. I would like to remind the group that there is no other place in the watershed where an extended discussion of a management strategy like this exists, so I would opt for not losing much.
- Blomquist: I suggest a table of contents be added up front at the beginning of the management strategy.
    - Allen: We haven't had tables of contents in the past, but we could consider adding that.
    - Phillips: Not more text, but I think a snapshot or table is a good idea.

Action: A table of contents will be considered for addition to the management strategy for Policy and Prevention for navigational purposes.

- Allen: We need to walk away with clarity on who is doing what here to update the management strategy.it gets more difficult at the sector specific questions
- Allen: it goes by source sector—current efforts for that sector, gaps. There are some additional activities that should be captured here. For stormwater regulatory efforts, there are programmatic gaps, for instance lack of PMP and trackdown resources for stormwater.
- Pinkney: Back to stormwater programmatic gaps--on the BMPs, and the fact that there is uncertainty in knowing which BMPs are most effective for PCB removal, I think that should be a research gap/science gap as well as a programmatic gap.
    - Allen: Agreed, and we will check to make sure that the BMP effectiveness is captured in all the sections that it should be captured in the Research management strategy as well.
- Other source/sectors:
    - Groundwater and source water: We have not addressed this in any meaningful way. Groundwater isn't necessarily a source of contaminants, but it is a conveyance mechanism.
    - Atmospheric sources—we have not updated atmospheric deposition since the 1990s, and we have not done much yet to fill this gap.
    - In-stream sediment: we have not done much on this either

IV: Current Efforts and Gaps (Current Management Efforts to Control or Reduce PCB Loads from Contaminated Sites):

- RECRA/CERCLA/federal efforts on contaminated and Superfund sites, and gaps.

    - Emily Majcher: Do we need to update these counts of cleanup sites and federal cleanup sites?
    - Allen: Yes, we will need to pull out updates for that. That's a section where the EPA and states should be reviewing that in detail for updates.
- Greg Allen asked how we want to go about this update for states and EPA. How do we want to divide up review and comments and updates? Could we ask all the jurisdictional reps to review this whole section, and then ask source leads to work on this? Or should we ask for specific volunteers for each source sector?
    - Mark Richards: I don't think this needs a full re-write, and so simple updates from jurisdictions are the way to go.
- Phillips: If you have been working in these source sectors over the years, take a look at the sections in current efforts and research gaps related to your work that you think should be reflected or updated in these sections?
- Allen: There are several items that could be updated to reflect work that we've done over the last two years. For instance, WWTP and PCB removal project, multi-benefit BMP scoring efforts, etc.
- Emily Majcher: I know of a couple projects that have evaluated PCB removal in some stormwater BMPs, which could be referenced in the management strategy.
    - Allen: If that's current work to address BMP effectiveness for stormwater PCB removal, then absolutely. This is because we know the TMDL is a vehicle for cross-addressing PCBs within nutrient and sediment management.
- Phillips: Can we look for a place under current efforts and gaps where you can look at BMP efficiencies, to look at co-benefit reductions for BMPs? Perhaps at the end of current efforts and gaps, or under management approaches?
- Onyullo: On BMP evaluations, it should not be so sector-centered. We know there are some sectors like wastewater that are required to collect data. We need to focus on that data to really index BMP performance. That data-driven decision making is the direction that I think we should go. I don't think stormwater facilities have as much data as WW facilities will have. Indexing BMP performance might be the way to go here. And we can add that to each source sector current efforts rather than a whole section under current efforts and gaps at the end.
    - Phillips: That might be another approach, to include BMP removal efficiencies as a separate factor rather than within each source sector description.

Action: The jurisdictions will commit to review and update the sections for current efforts and gaps (EPA Region III; researchers in those areas; jurisdiction leads).

V: Management Approaches:

- There are 4 management approaches: Regulatory, education and awareness, voluntary PCB removal, and science. We have proposed to add a fifth to include the PCB Consortium.
- Blomquist: I would suggest adding a status indicator in the table of management approaches and proposed actions.
    - Allen: We have the specific actions and status of these actions in the workplan. When we did the management strategy in 2015, we did not have a workplan at the time to accompany it, which is why the table of approaches and actions was included.
    - Phillips: Perhaps we could add short status to this table of approaches (in progress, ongoing, not started, etc).
- Phillips: How do you want to address things to be included in the approaches to address a new gap? For instance, if reviewers are updating factors and gaps, and notice that there are not management approaches to address those new gaps and factors, consider new approaches that could be added into this table? Perhaps the status could be something like whether or not it is in the workplan, or will be included in next workplan, or whether it is not in our workplan at all? These are the aspirational list of everything we want to do, and the workplan is the subset of the things we can do now.
- Allen: We will find some time to discuss how best to include a status update on this list of actions, and how to integrate that with the workplan.
- Phillips: Also, how will we include new approaches and actions to address new gaps. For instance, when we consider new contaminants other than PCBs? Perhaps we will start a new table of approaches for contaminants other than PCBs? For instance, if DC had some policy approaches to other contaminants like PAHs, for instance their PAH protocol? Would you want to add a new table for non-PCB contaminants, or just as an additional management approach for non-PCBs?
    - Allen: So a new management approach for policy and prevention of other contaminants, as opposed to research?
    - Phillips: The science for PCBs is in the Policy and Prevention is in PP as opposed to Research.
    - Allen: I think we should keep the science management approach solely for PCBs, however, and keep non-PCB research in the Research management strategy.
    - Blomquist: I'm ok with that, but we need to make it clear where the science is going to be listed for PCBs.
- Under Education and Awareness, we should be including the Fish Consumption Advisory infographic and the outreach around that. We should add some language about what we are doing next. We should be discussing the roll-out strategy development for that and the next steps.
    - Phillips: Current efforts and gaps doesn't discuss education and awareness, so perhaps we should consider adding some discussion of education and awareness in those sections as well.

- Allen: The rest of the section (*Approaches Targeted to Local Participation; Cross-Outcome Collaboration and Multiple Benefits)*, I, Michelle, and the CBP staff can work to update. The information in these sections shouldn't need more than minor updates for relevant work being done—for instance, reference to the Baltimore Urban Waters Partnership, some updates on multiple benefits and BMP co-benefits.

Action: Greg Allen, Michelle Williams and Doug Austin will lead on compiling and combining review and mark-ups of the management strategy. However, all members are asked to review and assist with specific updates.

Action: Greg Allen and Michelle Williams will work to review and update the sections on local collaborations, cross-outcome collaboration.

VI: Monitoring Progress:

- Phillips: Items 2 and 3 are pretty science-oriented. Can we cross walk those in our science activities to make sure we can carry out 2 and 3 here. Some of our limitations include limited monitoring data to accomplish 2 and 3.
    - Allen: It hasn't gone away as a gap and need. Given that we don't have a monitoring network, we have tried to piece together data from the patchwork of state and local monitoring.
- Phillips: Do we think we can move that over the next couple years, or do we have to keep that as status quo?
- Emily Majcher: MD is developing plans for monitoring for PCB TMDLs right now. There will be a bit of a lag but there should be a lot more data over the next two years.
- Onyullo: For PCBs, the approach to monitoring and progress is usually found in the TMDL reasonable assurance section. We need to see if the jurisdictions are actually following up on what the state is doing for reasonable assurance.
    - Blomquist: What this group can do is pull all that information together to see what the state and local jurisdictions are doing, in order to do a coordinated monitoring data collection effort.
    - Phillips: With a distinction that it has to be the sampling groups themselves to be collecting data, and our group can only pool and analyze that.
    - Allen: The jurisdictions also might have different end uses for that data, which influences what they are collecting and how it is being used in their permitting/regulatory activities. So the purpose for the states collecting data should be taken into account. MD is doing a pilot for instance with MS4 PCB monitoring.
- Ashley Toy: If MS4s are monitoring, they are tracking down sources, or they are capturing ambient contamination from nonpoint sources. We want to know whether the data can help us track locations where actual remediation can occur, rather than where nonpoint source ambient contamination is harder to manage. If there is no discreet source, we can't really remediate that. We could consider how to differentiate between

sources vs diffuse nonpoint sources in the course of the monitoring work. How can we help MS4s understand the science, and how we can assist in that part of the strategy?

- Majcher: That is where the monitoring plans will have to focus. And assisting with MS4 technical work will be a main thrust of the PCB Consortium, to facilitate that kind of guidance and learning among jurisdictions.
- Cargill: Developing implementation guidance is going to be important. The analytical method is important here. Arochlor vs 1668 (congener method). DE doesn't allow Arochlor detection anymore unless you can show there is a fresh source that is detectable using the Arochlor method. We use the 610 methods to take fingerprints as well. Taking fingerprints can give you a lot of information for these sources.
- Allen: We have worked on a trackdown guidance document a little over the last couple years, and we have about 40% completion. That is a gap that we have identified that the PCB consortium could work to complete and disseminate.
- Cargill: That approach is really important to consider when we consider this monitoring approach.
- Doug Austin: What is the scale of sites that are using these methods?
    - Cargill: We have some sites that push back due to the cost of analysis, but 1668A is the only way we allow detection if we are dealing with ambient and water data, when we are talking monitoring for permit compliance.
- Phillips: The science is currently organized 3 ways: I would like to make this more consistent: monitoring and analysis for sources (trackdown), then BMP effectiveness and source reduction, then monitoring for ecological effectiveness (fish tissue, ecological analysis), then summary (synthesis for better use of the data).
    - Toy: With that you have to discuss consistency and compatibility for jurisdictions, and the methods used to collect data. Once you know how it will be compiled, then you have to determine who will do the analysis, and how to get funding/resources to do that, and then a reporting mechanism to publish those analyses. What we also need is an inventory of sources. (sites known, and potential sources).
    - Majcher: But for TMDLs, those are ambient criteria, not specific sites.
    - Cargill: We had a TMDL, and we did trackdown and identified two waste sites, and we have an inventory of all sites in DE where we have PCB legacy sites. So I can take monitoring data and compare it back to the sites that we know of. For instance, we did trackdown and we know that the two primary sites have been remediated, and we found a secondary source of pipe sediment that had to additionally be removed. For us, keeping an inventory of sites and remediation work allows us to understand more about what the monitoring is telling us for management actions.
    - Phillips: Could we add something for assessing sources and inventory of sites, in support of potential trackback programs? I want us to have a more structured approach for this science section.
- Allen: This section for stormwater is important in relation to other items in our workplan. We need to know what the right data is, what the cheapest way to obtain is, and what the best way to use that data is.

- Allen: We will also post the PCB consortium discussion paper from the July 12 Management Board meeting discussion. Some content from the discussion paper will be pulled into the management strategy.
- Cargill: is there anything existing that you are thinking of as a partial model for the Consortium?
    - Allen: Some similar pieces might be the DRBC, Chesapeake Conservation Partnership, with dedicated full-time coordination funding, and Toxics Advisory Committee in DRBC.
    - Cargill: DRBC does a lot of regional data coordination, and some of that same data is included in NPDES. I like the idea of the top-level organization as an available resource for state and local organizations to turn to for coordination.

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4. Lunch

5. **Fish Tumor Research**—Fred Pinkney, FWS
   - In the Anacostia, catfish are used as indicators of habitat quality due to small home ranges. Mummichogs and other fish that have small home ranges can also be used as indicator species of habitat quality.
   - A two year study from 2014-2016 was conducted using the Anacostia vs neighboring areas and a Chesapeake Bay reference for background. Analysis of data from a 25 year database. Objective was to investigate linkages of exposure to PAHs, PCBs and DDT in fish as tumor promoters and to explain trends.
   - Effects of PAH exposure include tumors, skin legions, etc. PAHs form DNA adducts, and cause mutations. Can turn on oncogenes or turn off tumor suppressor genes. There are different diagnostic genetics for PAHs. Looking at diagonal radioactive zones in chromatograms.
   - Looking at older fish (more than 2 years). Electroshocking, holding overnight, necroscopy.
   - The study also used a large data set of samples from 2000 from Dave Valinsky. Looking at same sites, and comparing trends.
   - Current sampling sites include Bladensburg marina, CSX bridge, Dyke Marsh, Piscataway Creek.
   - Two covariates that are statistically significant include length and sex. Females have more liver tumors than males. Liver is involved in vitellogenin production (reproductive pre-cursor to egg production)
   - Found huge decreases in liver tumors in bullhead catfish since 2000, in some sites are equivalent to background.
   - Inflection point at 15 or 20 ppb, but with tumor rate, we are seeing decreased tumor rates with same concentrations of background PAHs.
     - Sediment samples for PAHs are limited
     - Might be more useful to look at fish.
   - We see 10-fold decrease in PCB and DDT fish concentration, in both bullhead and channel catfish, since 2000
   - Piscataway Creek is seeing levels of tumors similar to Anacostia—might be due to local signal.
   - Hoping for another round of data collection in 2020, 2021. Fish tissue data might be better to see trends rather than sediment samples. For skin tumors, may be connected to viruses, other mutations (working with (Vicki Blazer).
   - Ashley Toy asked about the length of the Anacostia in relation to home range (2 km).
     - Pinkney: We did track fish and we did not document any fish leaving the Anacostia and moving into the Potomac. We think they are staying around Dyke Marsh which is relatively clean compared to the rest of the Anacostia.
     - Found that otolith age is not sig covariate but is related to length.
   - Phillips: I hope that once this paper is published, we might be able to work with the CBP communications team to publish this in the Bay.net website.
   - Greg Allen asked about potential reasons for decreases in PAH.

    - Pinkney: There has been increases in enforcement in car oil changes, there is a coal tar ban in place in DC
    - Aaron Waters: The runoff prevention program is also newly underway in DC.
    - Pinkney: There may also be decreases resulting from better vehicle exhaust
- Greg Allen asked for Fred to send the sediment data.
- Greg Allen asked about the sample size.
    - Pinkney: it's small, the sample size is usually a composite of about 4 fish. When I do the composite, I usually find around a 20% difference, and we get the median for the composite sample.

6. Research Management Strategy and Workplan

- Scott Phillips introduced the strategy and workplan. We want to make sure this reflects the broader contribution of those who are working on this throughout the watershed. We have some folks from the CEC team at SRBC, and academic and local partners
- Scott Phillips reviewed the 5 categories of focus: fish and shellfish; Contaminants degrading fish and wildlife; occurrence, concentrations and sources; assessing relative risk and options for mitigation; issues of emerging concern and contaminants of emerging concern. This was the way we organized the last management strategy. We will try and update these today.

Research Factors:

- Modifications to the factors might involve less emphasis on relative risk, synthesis and implications, and using existing nutrient and sediment tools in looking at toxics. It's possible we might want to focus on source sectors and co-occurrence of contaminants at different sources. For instance, using CAST in conjunction with contaminants.

What We've Learned: Modifications to Factors (Landscape-scale prioritization)

- We need more work on addressing Hg. We have some mixed messages from jurisdictions in how much they want that but there are ongoing discussions of what Hg knowledge collection might be done.
- Also want to consider getting management implications for contaminants to the WQGIT and workgroups to understand what nutrient and sediment reductions can do for contaminants.
- Pinkney: Less emphasis on risk assessment? Why?
    - Scott Phillips: We did not make much progress on that in the traditional sense of taking one contaminant and coming up with risk thresholds. For many contaminants we can discuss relative risk but
    - Pinkney: If we are moving past PCBs, we need to prioritize the next contaminants we want to focus on. How will we prioritize that?

    - Phillips: We think that there are mixtures of contaminants out there, and perhaps we could take the approach of looking at how managing practices within source sectors can control those mixtures of contaminants?
    - Kelly Smalling: I agree with this approach. We also started with risk assessment, but we have so many contaminants we are seeing that could be interacting to cause effects. We are trying to understand areas where a fish could be at risk—geospatial rather than individual contaminants
    - Phillips: I would suggest that we focus more on the landscape settings rather than particular contaminants, so for instance urban/industrial, agricultural.
- Chris Brosch: I don't 100% agree with this approach. For nutrient management, there are some big-ticket items that we can do for those reductions. For a cocktail of contaminants, I think we need more scattered approaches for the various chemicals. We also want to make sure that we are not overburdening land managers while they are focusing on the TMDL. For management, we could consider co-benefits. But when we communicate, we need to make sure we are focusing on tangible benefits to the ag communities.
- Joel Blomquist: We are considering sources within those sectors rather than the sectors themselves.
    - Smalling: We are looking at very specific sources (row crops, manure application, landfills, etc)
    - Brosch: We need to make sure we have a broad menu for targets, and we need to be specific about what we are talking about.
- Mark Richards: From a TMDL development and implementation perspective, this makes sense. For a benthic impairment, we don't consider where the source is. We usually have limited data that prevents us from assessing the source, and we are only identifying stressors. For many contaminants, we don't have WQ criteria, so we can't determine if these contaminants are stressors that are causing impairments. Usually we categorize the stressor as sediment, hydro-contaminants, nutrients, or unknown.
- Greg Allen: Combining into the source grouping might work better for ag vs urban stormwater, where those pollutants have different chemistries. The chemistries of the contaminants will also determine what management actions you can take.
- Blomquist: The source ID is always one of the first steps you are looking at for management. The prioritization is still the question that determines how you spend your resources.
- Phillips: For toxics, isn't your prioritization and your criteria threshold based on their effects on living resources?
    - Smalling: We have better ideas about that for PCBs and Hg, but the newer emerging contaminants don't have that kind of information.
    - Upal Ghosh: We don't have the resources to solve those problems. We have two approaches we could take: we could say that we are only going to focus on contaminants that we know have discreet effects on wildlife and fish health, and we just have to wait for more research to be done on other contaminants before considering those CECs for management.

- Blomquist: Does that exclude prioritization here? Can we still consider those, even if we don't have a lot of information, but not discussing the relative risk there?
- Ashley Toy: Some of these categories of contaminants might have more implications for drinking water and human health, and fish health. Are there some contaminants that might have more impact on human or fish health that might be higher priority to focus on developing those risk thresholds?
    - Phillips: We have struggled over time with how to look at human health. That's a point we could discuss, whether we'd like to focus on human health more?
    - Smalling: Some of these CECs, we are doing some research now on tap water and drinking water. However, we can't always make that clear separation of issues of surface water vs drinking water.
    - Toy: but there may be differences in what pulls out into sediment vs water column. Looking at transport mechanisms and chemistries, and how those BMPs might be impacting transport mechanisms. What are we already doing that might reduce exposures in humans and fish? Perhaps transport pathways might be a way to start that prioritization?
- Allen: I hear strong support for this concept, and perhaps we can look at if the workplan and management strategy helps us streamline this?
    - Blomquist: The workplan can be the refinement of this process.

Action: Landscape-scale prioritization of research and management will be included in the Research management strategy and workplan, with less emphasis on risk assessment of individual contaminants. Further refinement of the stressor-based landscape-scale prioritization approach will occur in development of workplan items.

Fish and Shellfish Safer for Human Consumption:

- Ashley Toy: Note that there are Hg advisories for sushi, but that Hg is being imported into our watershed through human diets. There is public interest out there, so the time might be right to bring this back.
- Scott asked how widespread Hg impairments are in PA.
    - Amy Williams: We have some hg consumption advisories in PA.
    - Jim Shallenberger: Older, piscivorous fish have the most concentration of Hg and other contaminants.
    - Phillips: Our PA representative on the Management Board said that there's not a lot of need in PA, but that may not be the case of the whole state.
- Mark Richards: in VA, we have a lot of Hg impairments, and we are not sure yet how widespread that is. We postponed Hg because we didn't know how to address. Since we have changed our air deposition trends, we aren't sure what that means for Hg in the environment, and the lifespan of legacy Hg in the environment. This is an interest in VA to address in the next few years. We would like to develop a statewide Hg TMDL, but we need to address some of these issues first to understand how to manage it (e.g. interrupting Hg methylation process).

    - Phillips: How soon would you be looking into this? If we include this in the 2-year workplan, would that help you or is your time frame longer?
    - Richards: Yes, that could be beneficial to us in VA.
- John Cargill: Our concentrations are coming down in DE over time.
- Allen: MD has a statewide Hg TMDL in development, with some modeling support from VIMS.
- Richards: We got our first set of data that was collected last summer, and we are not seeing reductions in fish tissue reflecting reductions in air deposition.
- Allen: We have discussed developing a story map for hg.
- Smalling: We have done some collections where we are collecting fish tissue data, and that should be summarized by early 2019.
- Blomquist: What is the status of research on ecological health effects of Hg in fish tissues and in the environment?
    - Smalling: It's an immunosuppressant and potential EDC, but there is not extensive literature on that.
- Phillips: There has also been discussion on fish consumption advisories and subsistence fishing—is there more education or analysis on subsistence fishing practices where advisories could be targeted. Is there more that could be done from the PCB perspective?
    - Allen: if we looked at how the FCA programs are run, we could do some advisory work, but we have not done that analysis.
    - Ghosh: Hg analysis is built into the advisory assessments. There are some advisories in MD that are triggered by hg rather than PCBs.
- Doug Austin: Mainly Hg advisories occur in lakes where methylation is more likely to occur.
    - Allen: Some rivers too, we see Hg advisories dominate in the rivers, and PCBs in the estuary.
- Scott Phillips suggested adding oyster contaminants of emerging concern data.
- Allen: The STAC workshop for microplastics will also include oysters.
- Scott asked if we should consider recreational resources as well—bacteria, pathogens
- Waters: DC is concerned with that, right now we don't have legal swimming without a permit process.

Action: Hg, fish consumption advisories, CECs, shellfish, will be included in Research management strategy, but will not include recreational activities or bacteria/pathogens in the Research management strategy or workplan.

PCB Science:

- Emily Majcher: We want to consider the PCB mass balance modeling—should we consider this? Should we move it to the PCB monitoring under Policy and Prevention?
    - Allen: Will this get done reasonably? Is anyone asking for this? I think the answer is no. I think we should drop it from the workplan.

- Ghosh: I think that a mass balance would allow us to target some areas and do some of that prioritization. It's not easy and there are a lot of data gaps, there are some regional efforts on mass balance that may be applicable for a watershed scale mass balance. But I think it's valuable to keep there as an aspirational item.

Contaminants Degrading Health and Mortality of Fish and Wildlife:

- Discussion of relevance of keeping wildlife synthesis in the management strategy.
  - Smalling: there was a report, and I did follow up but there isn't interest right now in following up on that data to publish.
- Scott Phillips asked if we need more information on extent of fish health issues? How much work do we need to keep going on factors affecting fish health?
  - Pinkney: I think USGS is working on fish health studies priorities.
  - Vicki Blazer: We have found some of the yellow perch lack of reproduction are associated with toxic contaminants, as well as intersex, and possibly immune effects (but don't know what the influencing factor is in disease vs contaminants). And tumors are important
  - Amy Williams: We are not currently sampling in PA but USGS is working on that. We are sampling for different contaminants and pesticides for human health from fish consumption. And pesticides.
  - Jim Shallenberger, SRBC: We want to establish baseline monitoring and apply as there are programs in the watershed where we could apply those baselines. We don't have a focus group on contaminants of emerging concern.
  - Williams: We have a statewide focus group working on CECs, and we are not looking at fish tissue so much as water.
  - Mark Richards: for VA--in the Shenandoah watershed, we may have some issues but I'm not sure. There's nothing really apparent in VA that we are looking at the moment.
  - Cargill: There is a disconnect in what my program is looking at vs what you are looking at for data. We have more information on stuff at this level from the state fish and wildlife service. I have not seen where we have state-identified fish health issues vs toxic contaminant issues vs nutrient or sediment issues.
- Amy Williams: We do fish population and quantification surveys and document disease, but we don't routinely sample for fish.
- Blazer: WV DNR samples a lot for fish health, and we need to discuss how to bring the fish health and toxics together.
- Shallenberger: SRBC does a lot of fish sampling, but we don't focus ourselves on EDCs.
- Phillips: There is interest in fish health in some states but not in others. Big ones are reproduction, intersex, and tumors.

    - Cargill: It's not that we're not interested, it's just that this group here is on toxics but there are other groups in our states
- Ashley Toy suggested forming some kind of subgroup to facilitate work on fish health issues. Workplan item for next year?
    - Allen: this could have implications for cross outcome, cross goal team work (Fish Habitat, Forage Fish, etc)
- Majcher: If we will not include wildlife in our next workplan, perhaps we should only go with fish health and drop wildlife from the tile?
    - Cargill: Perhaps there are contacts in FWS that work on wildlife that have that information, but it doesn't cross into regulatory realms like this.
    - Blomquist: Perhaps we are seeing good news in wildlife where we don't need to do that work on wildlife.
- Emily Majcher asked how the mussel bioassays could be included in workplan
    - Pinkney: The mussels are more of an assay tool for Anacostia remediation.

Occurrence, Concentrations, and Sources:

- Emily Majcher asked about chloride TMDLs in MD—does that fit into the Research management strategy, and for other new contaminants coming online.
- Phillips: We thought work on co-occurrence of contaminants is important, especially in these CEC concerns. PA, how does this fit with the work that you are doing? Can we reflect what you are doing in this section?
    - Shallenberger: Yes, this is the direction that we are considering in SRBC and PA.
    - Phillips: We will add some language about coordination with your groups, and we will make sure to include that work in more detail in the workplan.
- Vicki Blazer: We have some work being done in urban watersheds with DNR and some with DEP.
- Amy Williams: We are looking at both urban and ag settings as well. And WWTPs. We also have some information on changes through time.
- Cargill: DE is in our second year of Chesapeake drainage sampling for legacy contaminants. This year will be neonicotinoids and sterols. The DE watershed is mainly agricultural land uses, so we are gathering information related to that source. We are publishing those summaries in early 2019. Through the Chesapeake Bay group using the Bay Implementation Grant funds (Marcia Fox is on that project).
- Brosch: There is one USGS project in Dover with pesticides and land uses for contaminants including chlorides. But some of the compounds in urban watersheds might have higher potency.
- Waters: Our integrated report is being updated to include other contaminants in various landscape settings.
- Phillips: There is a lot of work we would like to reflect for co-occurrence and landscape factors in contaminants.

- Ghosh: Local work is to understand fate and transport of PCBs, PAHs and pesticides. We are looking at legacy pesticides that accumulated in sediments, and we are not doing as much work on current usage pesticides. Our work is related to fate and transport, and mass balance work and what sources can be targeted. We've found that loading of PCBs in the Back River is higher than the net loading of PCBs going into the Bay. That means that the Back River PCBs in WWTP is capturing all those PCBs, and those PCBs are being stored in the biosolids that are going to the ag sector. We are also working on the remediation side.
- Phillips: For harmful algal blooms (HABs), how big of an issue is that? Both for toxins from HABs and the nutrients that create the HABs.
    - Mark Richards: That is an issue in VA but there is a whole other effort going towards that in the James.
    - Amy: We have some data for cyanobacteria, and some other toxins. We have done a little work on that topic.
    - Phillips: We could include this as an emerging issue for now and maybe consider more work on that in the future.

Implications for Mitigation to Inform Policy and Prevention:

- Ghosh: The mitigation involves treating contaminated sediments. The same technology of carbon- binding pollution in sediments, and we are looking at bioremediation activities. We are looking at a stormwater detention pond in Anne Arundel County for PCB remediation. We also have some funding from DOD to work on that.
- Discussion of Riparian forest buffers.
- Scott asked what is a priority to work on the nutrient team with CAST? For co-benefits?
    - Blomquist: What about a flowchart of mode of action for BMPs and the contaminants where certain BMPs are most effective?
    - Majcher: We need to move towards measured effects though
- Brosch: We have a qualitative benefit as well for carbon mitigation in DE. That's a 1-5 scale for effectiveness of some 200+ BMPs
- Pinkney: There are some studies that look at compost layers to reduce contaminants at different layers (Seattle) and effects of reduced contaminants on salmon.

Issues of Emerging Concern:

- Scott: We could consider putting HABs on CECs section. Are there other issues of emerging concern?
- John Cargill suggested considering per-flourinated organic compounds.
    - Allen: Is that groundwater or surface water?
    - Blazer: PA is looking at raw water and finished drinking water for PFOS.

- Allen: We can assess any data out there to see if there are surface water monitoring efforts and ecological thresholds.
- Blomquist: There is some work being done in Ontario.
- Lee Blaney is working on a PFOS analysis project. We can follow up with him.

Action: Harmful algal blooms may be considered an emerging issue for potential inclusion in the Research management strategy for more work in the future.
Action: Perflouro-alkyl substances will be considered for inclusion as contaminants of emerging concern in the Research management strategy.

Action: All partners asked to review the Research Management Strategy and workplan and provide comments and updates by August 1. Comments, feedback, and suggested revisions on the Research Management Strategy and workplan should be emailed to Emily Majcher (emajcher@usgs.gov) by COB August 1.

- Greg Allen: The public includes us, so even though we will have a draft out for public input by August 8, so we can keep adding comments and revisions between August 8 and September 13.
- Reminder: TCW call on August 8 will be unveiling of first draft management strategies and workplans.
- Reminder of PCB workshop September 26 (Bob Shedlock, urban waters partnership)
    - Mark Richards has invited City of Roanoke with progressive MS4 programs to join PCB workshop.

Meeting Adjourned

Meeting Participants:
Greg Allen, EPA CBPO
Scott Phillips, USGS
Michelle Williams, CRC
Doug Austin, EPA CBPO
Mark Richards, VA DEQ
Upal Ghosh, UMBC
Gary Shenk, USGS
George Onyullo, DC DOEE
Bill Brown, PA DEP
Amy Williams, PA DEP
Chris Brosch, DE DDA
John Cargill, DE DNREC

Kelly Smalling, USGS
Emily Majcher, USGS
Fred Pinkney, FWS
Lee Blaney, UMBC
Joel Blomquist, USGS
Aaron Waters, DOEE
Ashley Toye, EPA Region III (in for Micka Peck)
Jamie Shallenberger, SRBC
Tammy Zimmerman, SRBC