Discussion Paper: Developing Monitoring Networks for Addressing the CBP Toxic Contaminant Outcomes

Updated August 25, 2021

Issue: The Chesapeake Bay Program Principle Staff Committee (PSC) requested information to enhance the CBP monitoring networks. While the request is focused on the existing CBP networks, information is being included on monitoring needs of selected outcomes in the Chesapeake Watershed Agreement. The STAR team is leading the development of the information and has engaged the Toxic Contaminant Workgroup to develop monitoring needs for their outcomes: Policy and Prevention and Research.

The information being requested for the monitoring strategy includes:

- Need for a network (relation to CBP goals and outcomes)
- Network objectives
- Monitoring design considerations (media, frequency, sample number, method – field and analytical, locations – targeted, random), will be informed by objectives.
- Existing monitoring that can be utilized (what is being done, partners involved, current resources, and what could be leveraged (if possible))
- Remaining gaps
- Options to address the gaps. (This would be general, not a detailed network design but could have funding estimates).

The TCW leadership has discussed some guiding principles for the monitoring discussion:

- A monitoring network for a wide range of contaminants would be extremely difficult and costly, so we need to prioritize the contaminants to be addressed. For example, PCBs and mercury are listed in our outcomes so they could be a high priority.
- The monitoring objectives need to be specific to help focus types of monitoring that is propose with the design considerations considering the types of monitoring for different media.
- We need to take advantage of ongoing monitoring as a foundation for a network.

The TCW has been working through a process to develop information for monitoring request, and the progress to date is summarized.

Needs for monitoring network: Relation to Toxic Contaminant Outcomes

The TCW is focused on the monitoring needs identified in our 2 outcomes: Research and Policy/Prevention.

Policy and Prevention Outcome:

"Continually improve practices and controls that reduce and prevent the effects of toxic contaminants below levels that harm aquatic systems and humans. Build on existing programs to reduce the amount and effects of PCBs in the Bay and watershed. Use research findings to evaluate the implementation of additional policies, programs and practices for other contaminants that need to be further reduced or eliminated".

Research Outcome:
"Continually increase our understanding of the impacts and mitigation options for toxic contaminants. Develop a research agenda and further characterize the occurrence, concentrations, sources and effects of mercury, polychlorinated biphenyls (PCBs) and other contaminants of emerging and widespread concern. In addition, identify which best management practices might provide multiple benefits of reducing nutrient and sediment pollution as well as toxic contaminants in waterways:

Based on the two outcomes, the TCW leadership suggested four monitoring needs for contaminants:

- Changes to PCBs as TMDLs and associated management actions are implemented
- Changes to mercury as TMDLs and associated management actions are implemented
- Assessing contaminants of widespread concern (such as pesticides)
- Assessing contaminants of emerging concern (such as PFAS and microplastics)

The TCW discussed these needs at the July 14 meeting and prioritized them:

- Top two priorities were monitoring for PCBs, and emerging contaminants (such as PFAS and microplastics);
- Next priority was addressing contaminants of widespread concern (pesticides and potentially those used widely –listed in table 1, under supporting materials).
- Mercury was lowest priority

Monitoring Objectives

For each of these monitoring needs, the TCW (during July meeting) provided input on potential monitoring objectives. The TCW leadership used the input and developed these draft objectives:

- Determine if work in non-tidal zones due to remediation and management actions are resulting in downstream reductions of PCBs in fish in key tidal tributaries (impaired for PCBs) through consistent assessment methods (field and analytical).
- Determine occurrence or status of PFAS and microplastics in surface waters of the major tributaries of the CB with varied land use to establish a baseline to track concentration and loading changes through time using consistent methods and analytes.
- Determine if implementation of BMPs and conservation practices over time results in declines in pesticide concentrations using a prioritized/standardized list of pesticides, and consistent sampling and analytical methods.
- Are reductions in air deposition of mercury reflected in fish tissue declines, specifically focused on food/recreational fish trends in urban and non-urban areas

The draft objectives were discussed at the August TCW meeting, but no substantial changes were proposed.

Monitoring design considerations

The TCW leadership developed a set of questions that will need to be considered for the monitoring design considerations (listed below). Given the large amount of work needed to address these questions, the TCW leadership decided to just focus on the highest priority monitoring objectives (PCBs; and emerging contaminants).

• Do we have existing monitoring locations that could be leveraged, or will new locations need to be identified to accomplish this effort? Similarly, is there a gauge nearby that could facilitate loading estimates if a priority?

• Do we have information needed to design network for given objective? If not, what gaps exist? (e.g. inventory of remedial actions ongoing for PCBs, inventory of WWTP upgrades, BMP intensity by watershed? Others?)

• What training or guidance would be necessary to ensure consistent, successful implementation of monitoring in the watershed? (using any new sampling analysis methods unfamiliar)

• Cost ranking: High, medium, low (relative to other TC)

• Likelihood of success of enhanced monitoring – high, medium, low?

• Could we reflect progress as a quantitative indicator based on this new monitoring objective?

Existing monitoring that can be utilized

Needs to be discussed by TCW. What is being done, partners involved, current resources, and what could be leveraged (if possible).

Remaining gaps

Needs to be discussed by TCW

Options to address the gaps.

Needs to be discussed by TCW. This would be general, not a detailed network design but could have funding estimates).