# Note from Toxic Contaminant Workgroup Discussion on Monitoring (July 2021) and Proposed Monitoring Objectives

## Background

At the July 2021 meeting of the TCW, topics for potential monitoring objectives of the Chesapeake Bay Program (CBP) toxic contaminant outcomes were discussed. The discussion is responding to the CBP Principle Staff Committee's (PSC) request to enhance the CBP monitoring networks. While the PSC 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 are proposed 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.

## Next steps:

Based on the notes from July 2021, draft monitoring objectives for the toxic contaminant outcomes were developed. During the August 2021 TCW call, the monitoring objectives will be refined.

At future TCW meetings, the refined objectives will be used to discuss monitoring design considerations. Some of the questions the TCW will consider the following questions to inform monitoring design considerations:

- 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?

## Notes and results from July 2021

The TCW ranked potential contaminants and their potential monitoring objectives: :

1. Determine if programs are reducing the amount and effects of PCBs below levels that harm aquatic systems and humans.
2. Further characterize the occurrence, concentrations, and effects of emerging contaminants, such as PFAS and microplastics
3. Pe Further characterize the occurrence, concentrations, and effects of contaminants that have widespread distribution, with a focus on pesticides.
4. Determine if air-emission programs are reducing the amount and effects of mercury below levels that harm aquatic systems and humans).
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**PCBs:** TCW Jamboard input shown in numbered list. Highlighted areas used for proposed monitoring objective

1. Monitoring in areas of impairments to see if PCB levels are reducing
2. Regular monitoring of key tidal tribs that will indicate whether work in the non-tidal zones are reducing concentrations to fish
3. Surface-water concentrations over time in focused areas of remediation or management actions (river scale, tidal)
4. Is there enough evidence to show pace of change anywhere/source management that suggest every 5-10 years might be the sampling scale for the likelihood of trend detection
5. Fixed-periodic sampling (consistent methods) in fish, Bay-wide
6. Both local and baywide trends
7. Status: if we have a selection of key sites by jurisdiction, can we track % detections above regulatory limits? The % of sites above limits over time is a potential method of trend tracking from status assessment. Otherwise, we want to consider statistical design.
8. Leverage existing programs to establish PCB reductions in fish

**Proposed objective for PCBs**

**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).**

**Contaminants of Emerging concern (PFAS/microplastics)** - TCW Jamboard input shown in numbered list. Highlighted areas used for proposed synthesis monitoring objective.

1. Microplastics: Include bay sampling surface waters to evaluate distribution and establish a baywide baseline to track changes through time
2. Microplastics: suggest we could use 5 major trib monitoring sites and collection samples like the NTN network to get a microplastics load estimate for tracking sources and change through time
3. Sampling nearby major sources (WWTP and septic) – PFAS and/or microplastics
4. Occurrence for selected contaminants microplastics (PPAT) and PFAS (given growing concern)
5. Identification of sources

6. All states are beginning to monitor for PFAS for fish consumption programs -there is an early opportunity to standardize methods and centrally collect data
7. Occurrence in targeted, non-tidal tribs (NTN) for PFAS by standardized methods, frequency, etc.
8. Microcystins/HABs of wildlife and hh concern, maybe satellite tracking of cyanobacterial with focal sampling on microcystin assessment. Connects with the pollution diet and ecosystem change in response
9. Tissue monitoring for PFAS – tidal, non-tidal
10. To establish how pervasive PFAS is in the bay watershed, establish consistent methods and analytes
11. Standardize methods and number of PFAS compounds included by laboratories

**Proposed objective for PFAS/Microplastics**

**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.**

**Contaminants of widespread Concern (pesticides)** - TCW Jamboard input shown in numbered list. Highlighted areas used for proposed synthesis monitoring objective.

1. Tracking effects of management actions, (Implementation of BMPs) over time, would need to define scale/timeframe
2. Are pesticide levels declining as conservation practices are implemented
3. Application monitoring: Are organic farming trends changing the amount of pest being applied?
4. Groundwater monitoring- distribution, persistence, risk distribution to food and drinking water
5. Monitoring of ag chemicals supported by recent USGS studies and in coordination with areas where BMPs are known
6. Instead of sampling for specific contaminants, conduct toxicity screening/IBI to determine areas of concern
7. Prioritize/standardize list of pest to include in monitoring program

**Proposed objective for Pesticides**

**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.**

**Mercury:** TCW Jamboard input shown in numbered list. Highlighted areas used for proposed synthesis monitoring objective.

1. Is deposition reducing? Are concentrations in fish reducing?
2. Are mercury levels in air declining and are levels in fish declining as mercury reduced in air?
3. Food fish tissue levels w/ respect to urban and non-urban exposures (eg. Crabs in Baltimore/Patapsco vs. Tangier Island, White perch, sunfish, blue catfish)
4. Help determine if downward trend from atm dep is continuing to occur and how being expressed in tissue concentration?
5. How do impoundments compare to tidal and non-tidal areas in methyl mercury production?
6. Exposure assessment

7. Key food fish trends w/ DEQ. Considerations on distribution of risk with consumption of the most common fish consumed from recreation/subsidence catch. Aquaculture product risk: considering growth of aquaculture industry and leases in the bay
8. May not be a significant concern in Md as levels are declining (shift in species diversity?), Several delistings planned for 2022 IR, Still localized impacts in western MD

**Proposed objective for mercury:**

**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.**