

GIT funding RFP Topic Idea

Project Title: Proposed methodology to Integrate Co-Benefits of Select Urban Contaminants into the Chesapeake Assessment Scenario Tool (CAST) and other models

Goal Team: Water Quality and STAR. Joint project between several WQ GIT workgroups (Toxic Contaminants, Stormwater, Wastewater) and STAR (modeling team).

Technical Lead: TCW

Preparers: Scott Phillips, Emily Majcher (USGS), and others as shown in comments

Project Type: Performance Metric Development, Modeling Support, assessments of data to evaluate progress on metrics

Suggested Cost: \$40,000

Proposed outcomes: The project will provide approaches for developing removal efficiencies for select urban contaminant Best Management Practices (BMPs) into CAST and other appropriate model tools. The information will provide the basis for improved decision making by states and local governments on the co-benefits of nutrient and sediment practices to reduce contaminants, improve habitat conditions for fisheries, and make fish safer to consume by diverse groups in urban areas.

Justification. PCBs and other contaminants from urban areas (such as PAHs, mercury, and other metals) have caused fish consumption advisories and degraded the health of fish. Many of these areas are in low income areas where a portion of people's diet depend on fisheries. State agencies and local governments managing water quality and trying to improve habitat conditions for fisheries need improved information to mitigate toxic contaminants, and how they can take advantage of on-going nutrient and sediment reduction efforts.

TCW previously supported an effort to assess the Potential Benefits of Nutrient and Sediment Practices to Reduce Toxic Contaminants in the Chesapeake Bay watershed (Schueler and Youngk, 2015; 2016). Despite the exhaustive literature review conducted in urban and agricultural and wastewater sectors, there was little evidence at that time of published effectiveness of nutrient and sediment practices to remove toxic contaminants, and rather conclusions were made about probable practices using surrogates rather than direct measurement of reduction (e.g., sediment for hydrophobic contaminants like PCBs). Additionally, discussions with the CBP modeling team about CAST suggested without the information on BMP effectiveness of toxic contaminants, they could not be included into CAST. These issues, lack of BMP effectiveness data and the best way to package information into CAST, greatly limited progress on identifying potential co-benefits of nutrient and sediment practices to also reduce toxic contaminants.

However, there is new information to overcome these limitations for developing co-benefits between nutrient, sediment and toxic contaminant reduction. A STAC workshop held in May, 2019 (STAC, 2020) revealed advances in the use of stormwater practices for toxic contaminant removal have occurred, especially for PCBs and mercury, two of the toxic contaminants that drive many fish consumption advisories nationwide. These advances have largely been driven by the implementation of toxic

contaminant TMDLs in urban areas, particularly in the west/northwestern United States. While many of the advances have occurred outside the Chesapeake Bay watershed such as in the San Francisco Bay area and Portland and Spokane, researchers within the Chesapeake Bay watershed and the Department of Defense have advanced experiences more locally.

The new information provides a timely RFP topic to make progress on the toxic contaminant research outcome to identify which best management practices might provide multiple benefits of reducing nutrient and sediment loads as well as the presence of toxic contaminants in waterways. This proposed RFP topic will also benefit groups working to improve water quality goal, improve fish habitats, and make fish safer to eat by the diversity of people living in urban areas.

Proposed Project Steps and Timeline

The proposed project will focus on developing the best methods and approach to estimate toxic contaminant removal for selected urban BMPs that are also being implemented for nutrient and sediment reduction. These include structural, non-structural urban BMPs (green infrastructure) and wastewater treatment upgrades. This approach will provide a range of removal efficiencies for selected urban BMPs and how they can be considered CAST and other models being used by managers to assess the co-benefits for water-quality and habitat decisions.

The project will be completed through the following tasks:

1. Identify the green and gray infrastructure actions most implemented in areas with toxic contaminant impairments, approved TMDLs and established fish consumption advisories (i.e., Phase 1 or Phase 2 MS4 jurisdictions). This can be accomplished by working with the CBP urban stormwater and waste water workgroups, local governments in urban areas, and the CBPO BMP team. Develop listing of common practices considered for contaminant reduction that are not captured in existing models (such as dredging or capping).
2. Review literature to evaluate options for assessing contaminant reduction (and the conditions under which that reduction was measured) for green and gray infrastructure practices, and remediation methods identified in 1. In addition, assess knowledge gaps in required information to accurately build reduction scenarios into existing model platforms (e.g., CAST and SWMM)
3. Review the state of the science to assess if surrogates can be used to help estimate effectiveness of removal of toxic contaminants. For example, look at information on sediment reduction and see if it can be used for estimating contaminant reduction for selected urban BMPs and contaminants. Focus will be toxic contaminants causing majority of impairments in the Chesapeake including PCBs, PAHs, Mercury, organochlorine pesticides and selected metals. Identify where surrogate approaches have been used elsewhere for contaminant modeling.
4. Consult with coordinator of BMP expert panels to develop data quality criteria to reflect confidence in the reported removal for use in the CB watershed, e.g., Table 1 in the WQGIT's BMP Review Protocol (see below). New expert panels are not envisioned but we want to use their guidelines to recommend categorization of the case study information gathered for each prioritized BMP and the contaminant removal case study results based on location of study, comparison of climatic conditions if outside the watershed, co-contaminant presence, and other potential factors.

5. Form a technical advisory panel at the beginning of the project and engage CAST and watershed model staff within CBPO at least quarterly to ensure that approaches and findings are consistent with information required for inclusion in various tools available and useful to stakeholders.
6. Prepare a summary report and communicate findings, justification, and recommended approach to integrating information into CAST and other decision tools to best estimate co-benefit reduction of toxic contaminants. Recommendations should include if possibly, suggested format of information gathered in 1, 2, and 3 above to support this integration into tools and provide documentation as requested by the modeling team.

Co-Benefits: Toxic Contaminant Policy and Prevention: working to reduce PCBs in the watershed. Toxic Contaminant Research: develop information on the co-benefits of toxic contaminant, nutrient, and sediment reduction. Watershed Implementation Plans 2025: information needed to consider co-benefits of practices for 2-year milestones. Fish habitat: improving aquatic conditions for freshwater and estuary fisheries. Diversity: making fish safer to each in diverse urban areas. Local governments: making urban waters more fishable.

CBP Expert Panel Protocol:

https://www.chesapeakebay.net/documents/CBP_BMP_Expert_Panel_Protocol_WQGIT_approved_7.13.15.pdf

Prepared by Emily Majcher and Scott Phillips. Last update May 26, 2020