DRAFT – 5/1019

WQGIT Options Paper: Proposed Process and Schedule for Developing Sediment Planning Targets in Phase III to Meet Water Clarity/SAV Water Quality Standards

Background

EPA established the Chesapeake Bay TMDL to meet the applicable water quality standards (WQS) in the Bay, including sediment – specifically, water clarity/submerged aquatic vegetation (SAV) water quality criteria. Excessive sediment fines (silts and clays) in the water column can reduce light to levels insufficient for SAV growth. The sediment allocations in the TMDL were established differently than those for nitrogen and phosphorus, given scientific and technical findings on the importance of nutrient loads relative to sediment loads in the impairment of SAV in tidal waters as described below. It is important to note that while all lines of evidence point toward nutrients playing a larger role in SAV recovery, there are detrimental effects that sediment has on the clarity/SAV WQS and state-level regulatory frameworks of the tidal CBP States address this issue.

Development of Sediment Planning Targets in Phases I and II

In Phase II, the partnership estimated that full implementation of the Phase II WIPs would reduce the sediment loads to the Chesapeake Bay by about one third from 1985 loads, compared to a reduction of about one half for nitrogen and phosphorus over the same period. In Phases I and II, the partnership found that a greater level of BMP implementation was needed to meet the nutrient-based WQS, primarily for Deep Water and Deep Channel dissolved oxygen (DO), than was needed to meet the sediment-based water clarity/SAV WQS. This is because many of the BMPs implemented to achieve nutrient load targets, such as farm plans, cover crops, conservation tillage, and stream restoration, also remove considerable loads of sediment. In addition, we found that the water clarity/SAV WQS is generally more responsive to nutrient load reductions than it is to reduction of sediment loads.

The CBP partnership agreed in the 2010 Chesapeake TMDL document for the Phase I WIPs, and subsequently at a June 2011 WQGIT meeting for the Phase II WIPs, that the primary emphasis in the WIPs should be on nutrient reduction management practices, which by their nature of reducing both nutrient and sediment loads in the watershed also achieve the water clarity/SAV WQS (Figure 1). This decision was further supported by research and findings in the Chesapeake (Gerbisz and Kemp, 2014; Lefcheck et al., 2018). In addition, sediment is already the subject of thousands of local sediment TMDLs in streams and rivers being implemented by the Chesapeake Bay Program partners. There are also many streams impaired for sediment for which TMDLs have not yet been completed. Accordingly, the Phase II sediment targets were calculated using estimated sediment load delivered to the Bay resulting from the BMPs that the jurisdictions planned to implement to meet the Phase II nutrient targets. An additional 10 percent buffer was added to the calculated sediment target in each major basin-jurisdiction to account for the overall model uncertainties in the calculation of the sediment targets, including uncertainties in the estimated sediment reductions of the BMPs and overall uncertainties in sediment fate and transport in watershed streams and rivers.

Proposed Phase III Sediment Targets Process

The recommended approach for setting Phase III sediment targets would be to follow the same process used in Phase II. Specifically, initial Phase III sediment targets can be calculated after the Bay jurisdictions submit their draft Phase III WIPs by quantifying the estimated sediment load reductions brought about by the Phase III WIP management practices and BMPs, and the sediment loads delivered to the Bay. However, use of this option depends on the Phase III WIPs in the major basin-jurisdictions meeting the nutrient targets. If a major basin-jurisdiction Phase III WIP fails to meet the nutrient targets, an additional sediment target load reduction would be calculated based on the proportion of the missed nutrient load target. In all cases an additional 10 percent would be added to the calculated sediment target in each major basin-jurisdiction to account for uncertainty. Examples of the proposed approach are shown in Attachment 1.

Additional Issues to Consider

On the April 12, 2019 WQGIT Call, jurisdiction partners raised two additional issues they felt were in need of additional consideration and analysis by the WQGIT before presenting options and recommendations to the PSC on sediment planning targets for the Phase III WIPs.

Conowingo WIP:

One issue raised for draft sediment targets was the Conowingo WIP, which will be finalized after the Bay Program partners' Phase III WIPs. In this case the sediment target for the Conowingo WIP would be developed by the process described above, once the BMPs and management actions are identified in the final Conowingo WIP.

Nutrient Targets to Address Risk of Climate Change to Chesapeake Water Quality Standards in the 2022-2023 Milestones

An additional issue raised by the WQGIT was the possibility of additional nutrient reductions in 2022 to maintain attainment of the living resource based water quality standards in the Chesapeake due to future climate change. The PSC has directed in their December 20, 2017 and March 3, 2018 meetings that jurisdictions account for additional nutrient and sediment pollutant loads due to 2025 climate change conditions in a Phase III WIP addendum and/or 2-year milestones beginning in 2022. Bay jurisdictions may have voluntarily incorporated numeric adjustments in their Phase III WIPs that address the estimated nutrient reductions for 2025 climate change conditions, but others may have simply addressed this issue narratively. This creates the potential for imbalances in the draft sediment targets and gives rise to the following three options for PSC consideration. Option 3 below would establish "interim" sediment targets until 2022 which would place sediment on a schedule comparable to the Partnership-approved timeframe and approach for addressing any additional nitrogen and phosphorous loads due to 2025 climate change conditions.

Option 1: Targets include additional reductions beyond N and P targets (including climate change)

One option would be to exactly apply the method described above in the Phase III Sediment Targets Process section as is and rely on relatively small changes in nutrient load needed to address any additional reductions in the Phase III WIPs which go beyond the N and P 2015 targets and any additional climate change reductions in 2025, as well as the 10 percent buffer for uncertainty, to address differences in the incorporation or non-incorporation of climate change conditions in the current draft Phase III WIPs.

Option 2: Targets without additional reductions (including climate change).
With the differences in response to 2025 climate change in the draft Phase III WIPs received on April 12, 2019, one option would be to remove any additional nutrient reductions over and above the Phase III WIP targets (Attachment 2) so that all the draft Phase III WIPs had the same starting point. A further two options are available for this approach.

Option 2a) A proportional approach could be used to adjust the sediment target to only cover the nutrients required to achieve a Phase III WIP nutrient target. independent of any additional nutrient reductions, including those for climate change.

Option 2b) Request the CBP partners do the separation for those BMP and management actions that are to be applied only to final WIP nutrient target and those to be applied to only to currently estimated 2025 climate conditions.

Option 3: Interim Targets until 2022
The third option would be to apply the Phase III Sediment Targets Process section as described in Option 1 above, but in this case consider the sediment targets to be interim sediment targets that would be reopened as needed in 2022. This would be consistent with the Partnership-approved approach for addressing any additional nitrogen and phosphorous loads due to 2025 climate change conditions that would be included in a Phase III WIP addendum and/or 2-year milestones beginning in 2022.

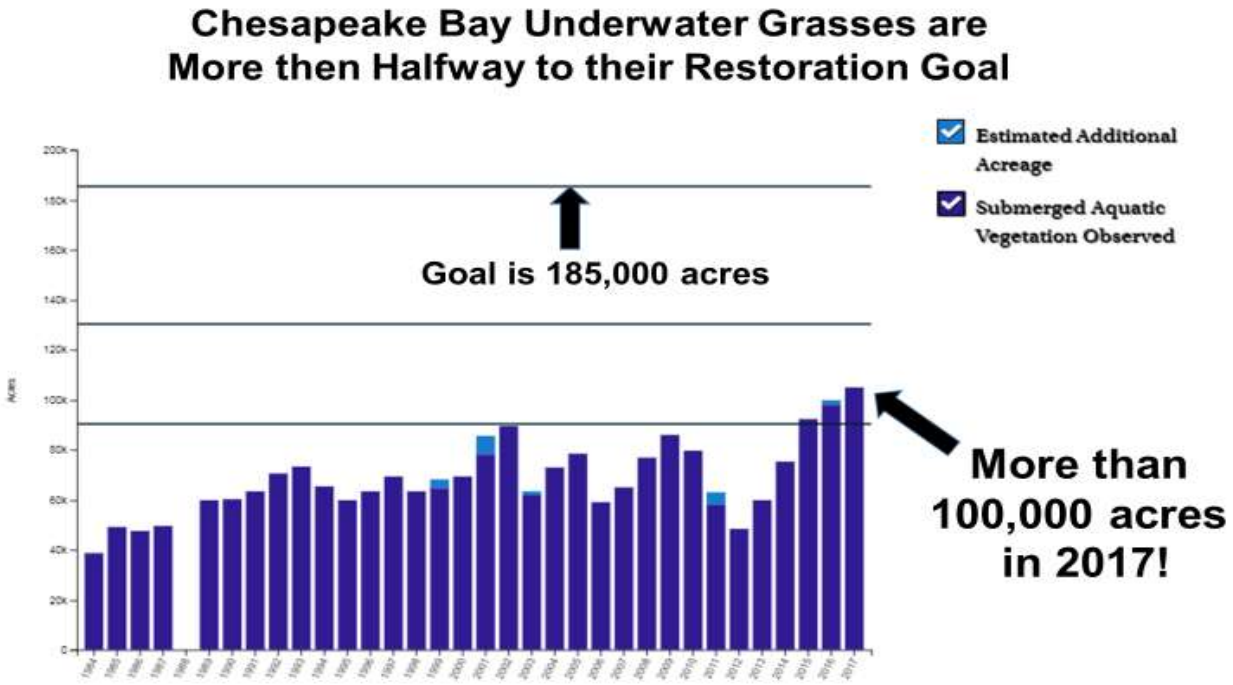
Proposed Schedule (Steps 1 – 7 apply to all 3 options; Steps 8 – 11 applies to Option 1 and Option 2 only)

1. April 12, 2019 – Draft Phase III WIPs received from all jurisdictions.
2. April 22, 2019 – Draft Process and Schedule for sediment planning targets presented to WQGIT.
3. April 29, 2019 – Draft Sediment Targets Process and Schedule posted for PSC review prior to May 9th PSC Meeting.
4. May 9, 2019 – Request for PSC direction for Process and Schedule for Phase III Sediment Planning Targets.
5. May 13, 2019 – Water Quality GIT Meeting to address policy direction/decisions from May 9 PSC Meeting.
6. June 10, 2019 – Draft Sediment Planning Targets presented to WQGIT for review and PSC consideration.
7. July (TBD) – PSC Conference Call to approve Draft or Interim* Phase III Sediment Planning Targets.
8. August 9, 2019 – Final Phase III WIPs submitted by jurisdictions incorporating Draft Sediment Planning Targets.
9. Mid-August – Final Phase III Sediment Planning targets sent to WQGIT for review and approval for PSC consideration.
10. Late August/Early September – PSC Meeting or Call to approve Final Phase III Sediment Planning Targets.

11. Mid-September – Final Phase III Sediment Targets posted by EPA and added by each jurisdiction to its Final WIP as an addendum.

* Option 3 concludes at Step 7 with Interim Phase III Sediment Targets, but Option 1 and Option 2 continue through Steps 8-9.

Figure 1. Observed SAV acres in the tidal Chesapeake from 1984 to 2017.



References

Gerbisz and Kemp, 2014. Unexpected resurgence of a large submersed plant bed in Chesapeake Bay: Analysis of time series data. *Limnology and Oceanography*, 59(2), 2014, 482–494.

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*Awarded the National Academy of Science Cozzarelli Prize.