DRAFT – 04/22/19

Process and Schedule for Developing Sediment Planning Targets in Phase III to Meet Water Clarity/SAV Water Quality Standards

April 22, 2019

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.

Technical Developments in Phase 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. An example was described by Gerbisz and Kemp (2014), where the SAV recovery in the Susquehanna Flats was found to be initially due to nitrogen load reductions resulting from low flow years (1997-2002). Positive feedbacks from the initial resurgence of SAV in the Flats contributed to further increases so that record levels of SAV in the Susquehanna Flats were achieved in 2011 prior to Tropical Storm Lee and now continue to increase year over year during post-storm recovery. This is despite a trend of increasing sediment loads in the Susquehanna River over the period of SAV recovery, thought to be brought about by Conowingo Reservoir infill (Hirsch, 2012). Further, a recent award-winning article in the *Proceedings of the National Academy of Sciences* found that nutrient reduction was the prime determinant in SAV recovery in the Chesapeake Bay and that "…total suspended solids [sediment] did not emerge as a strong predictor of [SAV] cover…" (Lefcheck et al., 2018) Finally, assessments of water clarity/SAV attainment during Phases I and II of Bay TMDL implementation have demonstrated that BMPs designed to reach nutrient targets are sufficient to achieve the water clarity/SAV WQS. This is supported by the last three years of observed SAV acres being record years for SAV, with each of the years above 100,000 acres of SAV, which is more than half way to the 185,000 acre SAV goal (Figure 1).

Development of Sediment Planning Targets in Phases I and II

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, and as backed up by more

recent research findings (Gerbisz and Kemp, 2014; Lefcheck et al., 2018), 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. 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. Accordingly, the Phase II sediment targets were calculated using sediment load reductions 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 target including uncertainties in the estimated sediment reductions of the BMPs and overall uncertainties in sediment fate and transport in watershed streams and rivers.

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. An additional 10 percent would be added to the calculated sediment target in each major basin-jurisdiction to account for uncertainty. However, use of this option depends on the Phase III WIPs in the major basin-jurisdictions meeting the nutrient targets. Examples of the recommended approach are shown in Attachment 1.

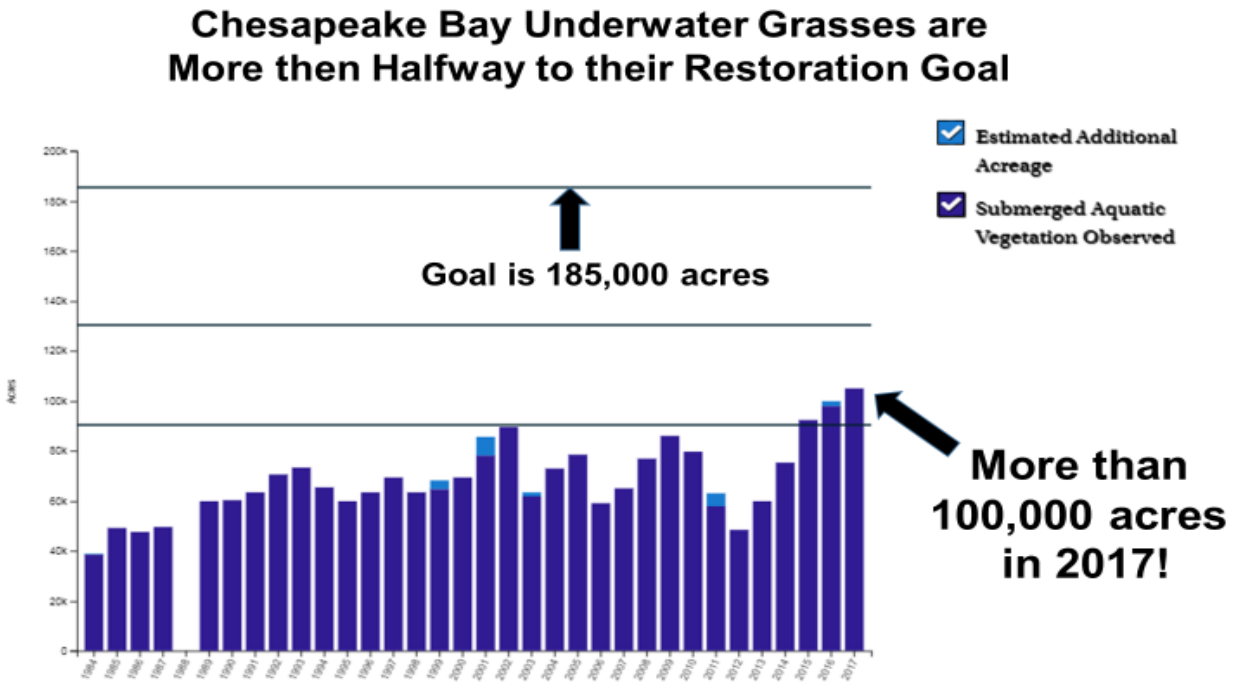
If one or more of the draft Phase III WIPs fail to meet the nutrient targets, then the initial Phase III sediment target for the major basin-jurisdiction that fell short of the nutrient target can be calculated, in part, by the process described above of quantifying the estimated sediment load reductions brought about by the Phase III WIP management practices and BMPs that, in this case, achieved part of the nutrient targets. Then, there would need to be added an additional sediment target load that would be calculated based on the proportion of the missed nutrient load target. As in the previous case an additional 10 percent would be also added to the calculated major basin-jurisdiction sediment target to account for uncertainty. See examples in Attachment 1.

Proposed Schedule

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 for approval and PSC consideration.
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 approval for Process and Schedule for Phase III Sediment Planning Targets.
5. June 10, 2019 – Draft Sediment Planning Targets presented to WQGIT for review and PSC consideration.
6. July (TBD) – PSC Conference Call to approve Draft Phase III Sediment Planning Targets.
7. August 9, 2019 – Final Phase III WIPs submitted by jurisdictions incorporating Draft Sediment Planning Targets.

8. Mid-August – Final Phase III Sediment Planning targets sent to WQGIT for review and approval for PSC consideration.
9. Late August/Early September – PSC Meeting or Call to approve Final Phase III Sediment Planning Targets.
10. Mid-September – Final Phase III Sediment Targets posted by EPA and added to each jurisdiction's Final WIPs as an addendum.

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.