Follow-up Actions Taken for the Water Quality Sediment Transport Model (WQSTM) Peer Review Panel

STAC WQSTM Peer Review
July 7, 2017

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Modeling Team

Chesapeake Bay Program
Science, Restoration, Partnership

Our World:

- Prepare draft WIP3 Targets, Conowingo infill analysis, and climate change influence on CB water quality standards analysis for two-day September 25-26, 2017 meeting of the Water Quality Goal Implementation Team (high level technical managers).
- Prepare refined presentations on the same topics to the Principal Staff Committee (cabinet level decision makers) in October 2017.
- Approval and public release of final Phase III WIP Planning Targets with special cases at March 2018 PSC Meeting. The WIP3s will guide all implementation of Bay restoration from 2018 to 2025.
- Need WQSTM Peer Review completed in July/August 2017.

Actions Taken in June 2017:

1. Post on the Modeling Workgroup website the key scenarios of 1985 Progress, 2009 Progress, WIP2 Level of Effort, E3, No Action, and All Forest, and other scenarios. The CBPO Modeling Team has lead on this. The task covers Phase 6 Watershed Model (WSM) scenarios only, not the WQSTM, b/c WQSTM interim calibration to the June 1 WSM loads will not be completed until early July and the final WQSTM calibration will be completed by the close of July.

2. Sensitivity scenarios of estuarine circulation with estimated surface elevation only by the close of June. Better develop foundation for why estimated Bay mouth bottom salinity is increasing though findings from other studies. Ping Wang has lead. The approach will be to use the 1993-1995 WQSTM simulation period to compare scenarios of 1) Base Case w/ out sea level rise (SLR) or boundary salinity change, 2) SLR only w/out salinity boundary change, and 3) SLR w/ salinity boundary change. In (2) and (3) expect an increase in gravitational circulation.

3. Examine the current (2017) WQSTM to see if large differences are found from results of the 2010 model. Use Phase 5.3.2 loadings for both the Base Case and WIP scenarios. If significant changes are found, work to understand how they arise and their implications. Carl Cerco has lead. The approach will examine if there are any large changes seen between results of the 2010 WQSTM (with labile and refractory particulate organic matter) and the current WQSTM (with G1, G2, G3 particulate organic matter) run under the same Phase 5.3.2 load conditions.

4. Examine changes of G1, G2, and G3 from the watershed and shoreline erosion loads. Examine how the total reactivity of nutrient loads may be changing between the P5.3.2 and P6 models. Carl Cerco Lead. This task is to compare the total loads of nitrogen and phosphorus for all nutrient species in detail for the 2010 and 2017 versions of the WQSTM for both the Base Case and WIP scenarios.

5. The peer review group recommends that Carl primarily focuses on recalibration to the Phase 6 loads to examine possibility of an interim WQSTM calibration run with the updated Phase 6 scenarios to get results for the peer review panel (short-term: June). Carl Cerco lead.

Actions to Be Taken Over the Next Quarter

6. Reconsider the elimination of chlorophyll from the light attenuation calculation (S. Chapra & Marjy F. to discuss). Carl Cerco lead.

7. Need to develop ranges in climate change scenarios – need upper and lower bounds rather than a single end point (midterm summer goal). CBPO Modeling Team lead.

8. Longer term: consider more phytoplankton groups for climate change studies particularly cyanobacteria and avoid "bell shaped" growth curves. Carl lead.

9. Consider the contra-case for climate change, oyster aquaculture/sanctuaries, and Conowingo infill – how much do we need to change the modeled forcing to see a difference in water quality. Overall CBP decision needed here with guidance from CBP decision makers.

10. On documentation (Carl and Lew lead):

- Explicit details in the WQSTM documentation for G1, G2, and G3 particulate organics are needed.

- Improved documentation of how the outputs from the Conowingo Pool Model were used to estimate G1, G2, and G3 under all Susquehanna flows is needed.

- Better documentation of the boundary conditions for the sea level rise scenario is needed.

- Documentation of the estimated shifts in tidal wetland area in the future (2025, 2050, and 2100) conditions and better documentation of Sea Level Affecting Marshes Model, or SLAMM is needed. Provide GIS files for relevant SLAMM scenarios to Bay Program for archiving. Document use of the files

- Improved documentation on how the oyster growth model is implemented (this is planned to be a chapter in the final report).

Long-Term Tasks: The importance of Technology Transfer/Succession Planning

11. Suggestion of a technology transfer/legacy workshop to preserve knowledge and understanding of the ICM water quality model of the Bay. This is important for succession and for the technology transfer of a quarter of a century of water quality modeling experience. The summer course could be taught by water quality modeling practitioners experienced in ICM and could be for one week or a two week course split into 2 weeks on ICM WQ Modeling. Use a 30 box or 10 box model for teaching purposes. (This could be done in the summer of 2018.)