Modeling Workgroup Conference Call
March 10, 2016
2:00 PM – 4:30 PM

For Remote Access:
Adobe Connect: https://epa.connectsolutions.com/modeling/ (enter as guest)
Conference Bridge: 866-299-3188 code 267-985-6222#
Event webpage: http://www.chesapeakebay.net/calendar/event/23740

MINUTES

Phase 6 Review Process – Lee Currey, MDE and Dave Montali, WVDEP
Attachment A

- SAVE THE DATE: April 26-27, 2016 – Quarterly Review
- Dave and Gary reviewed the webinar presentations provided for the Agricultural Workgroup, for which there was good participation and a number of questions from over 50 participants.
- In terms of schedules and deadlines, the Modeling Workgroup is in the midst of several beta versions of both the Watershed Model (WSM) and the Water Quality and Sediment Transport Model (WQSTM). The Modeling WG is also expecting improved land use information from the Chesapeake Conservancy that is expected to be delivered by September. Historic data information that is being cleaned up by the states will also not be available until September.
- A meeting will be held on March 11 with the WQGIT leadership to discuss review process throughout this year. There was a great deal of documentation released earlier in 2016 regarding the model development and refinement processes, and it is important to make sure that partners are not overwhelmed by the volume of information available.
- Lee walked through the review schedule for both model refinements and webinars, the layout of documentation, and the feedback that is being sought from Modeling WG members for the three Beta versions of the WSM. The expected release date of the Beta 2 version of the model is set for late April.
- Bill Ball emphasized that he would need to coordinate with Gary Shenk regarding the STAC review of the model. Gary also pointed out that with improved documentation from the Beta 2 version, the STAC review should be made easier.
- Work that still needs to be done as part of the process includes mapping out the differences between the different betas of the model. There is still much to be determined for Beta 3 and the final model.
- Lee also posed several questions that may need to be addressed by the modeling team for the benefit of the WQGIT:
    - Can the WQGIT be provided with the differences between beta versions of the model?
    - While there may be changes in the average load from river delivery that will be slightly tweaked in between versions, what are the monumental changes? When will the other models for Conowingo be brought into the WSM? Are there any

other expected changes with regards to phosphorus that we are likely to see? Pulling out these kinds of big picture items would be helpful when talking with the WQGIT.

- As the model is locked down in September and presented to the WQGIT in January 2017 it is expected that they would like a period to comment on the model. Lee asked if STAC would also want an opportunity to weigh in again at that time. Bill Ball suggested that they may want to view the model after calibration.
- It is important to note that in meeting our schedule, the partnership may still choose to make changes in the model inputs. This will, however, not affect the underlying model processes.

Progress in the Development of the Phase 6 Watershed Model – Gopal Bhatt, PSU and Gary Shenk, USGS
Attachment B

- Gopal provided an update about progress made in some of the hydrology scenarios, particularly with regards to capturing specific extreme events in the modeled time period.
- Gopal first demonstrated points within the simulation where there was room for improvement in the extreme events, particularly the underrepresentation of six major flow events in the Susquehanna River Basin.
- Initially, there was concern that Gopal's fix might go outside of the process based methodology employed in simulating hydrology. However, the history of HSPF is really a sort of empirical fitting to the hydrograph of equations that match data. In essence, the fix outlined is actually keeping with the method by which hydrology has been captured previously by HSPF.
    - The performance is not necessarily degrading because of a small number of points outside of the box and whiskers plot.
    - It is suspected that the special action will improve the sediment and phosphorus calibration. In past versions the modeling team was able to see that there was an underrepresentation of loads as shown by a comparative WRTDS analysis. Lew noted that with this improvement in flow we will hopefully better capture sediment and phosphorus in the Beta 2 version of the model, primarily through improved representations of scour.
- A decision was made to move forward with the fifth option outlined on slide 14 of Gopal's presentation, a method to modify the INFEXP parameter. There were no objections from the workgroup

HEC-RAS Work In the Lower Susquehanna – Jon Viducich, WEST Consultants
Attachment C

- Jon provided a status update, rather than a summary of results as the HEC-RAS work is just shy from wrapping up this section of the process.
- Current work is still being completed using a one dimensional HEC-RAS sediment transport model for the modeled river between the Marietta gage and Holtwood Dam.

- A current internal review is also concerned with the error bounds of large flows through the modeled extent.
- There is also a plan to perform production runs, which will take the calibrated model and use it to make predictions that will help populate the rating curves a bit more at the upper ends of the plots. It is expected that updated curves will be ready for distribution in the next two weeks, and from there it can be incorporated into the Beta 2 model.
- 12 sediment size classes are being used, and were aggregated into three to match with those used in HSPF. The classes are determined from bed composition and USGS recorded observations.
- From this point, the sediment classes existent in the bed can then be tracked. Larry Sanford asked if these classes will be in the output that will be distributed. Jon noted that the class breakouts can be provided to those interested.
- Larry is asking for bed materials specifically, and the evolution of bed materials for longer term runs as well because as time progresses you would want to model replacement to determine if finer particles are traveling over the dam.
- As a note, there might be a coarser fit in these sediment breakouts since a cross sectional average is being provided in this 1-D model.

Progress in the Development of the Water Quality and Sediment Transport Model (WQSTM) – Carl Cerco, U.S. CoE ERDC
Attachment D

- Carl reviewed updates to the runs of the WQSTM with more recent WSM updates, including the influence of wetlands on load attenuation and their denitrification impacts.
- What has been seen thus far is that the impacts of wetlands in the model tend to be region specific and do not appear to have a large impact on Chesapeake Bay main stem.
- Carl also looked at the differences in model outputs with non-flow distributed error that Ping is working to correct.

Tree Canopy Targets Loading Rates – Justin Hynicka, Maryland Forest Service and Olivia Devereux, Devereux Consulting
Attachment E.1, *Attachment E.2*, *Attachment E.3*, *Attachment E.4*

- Lew put forth that the Modeling WG wanted to understand the mechanism of nutrient attenuation so that the group could be satisfied with the technical underpinnings of this recommendation and put forth a decision. The decision would therefore include an agreement to move forward with the attenuation rates as they were described by the presenters.
    - Rebecca Hamner noted that they were hoping for a favorable decision from the Modeling WG so that the new tree canopy data could be included in the next model calibration before it is taken to the WQGIT.
- The expert panel has taken the results and work that Marion and Justin have completed and have in turn been receiving briefings and are incorporating the results into their report. The expert panel is concentrating on the tree canopy BMP that will be brought forward at the end of April which involves loading rates. The Forestry Workgroup is

strongly supporting having tree canopy land uses in the Phase 6 WSM for both policy and technical reasons.

- Justin also presented the methods by which runoff could be attenuated for different tree species. The inputs of precipitation were expanded from eight locations, and the area of rainfall captured changed with this as well.
- The justifications for prescribing different rates for pervious and impervious surfaces were also more greatly expounded upon in the presentation. Additionally, the proportion of nutrients stored represent the average uptake of nutrients stored as wood biomass.
- Bill Keeling brought up several questions regarding points of impact from the tree canopy land use and concomitant sediment reductions that were answered by Justin, and these are summarized below:
    - Bill expressed concern that reductions would not be captured on the acres that are being impacted, and that a general effect downstream could not be applied to impervious acres that had tree canopy with no possibility for reductions in modeled sediment dislodgement. Furthermore, he did not recall this being presented to the technical workgroup, and had reservations about the role of detritus also acting as a potential loading source.
    - Justin noted that there is potential for erosion from that land use itself, and the primary challenge lies in completing the rating curves. Olivia and Justin also noted that what was presented to the Modeling WG was presented to the technical workgroup a week prior and to other workgroups as well. Justin also further explained the challenges in representing detritus decomposition, and that many decisions were deferred to the expertise provided by the street sweeping expert panel that looked at the question in great detail. While Bill stated that many articles found by that workgroup showed tree canopy as a loading source, it also depends upon the ultimate source of the nutrients. If there is through-flow which is entering the stream regardless, then the tree that may take up the nutrients transforms the load so that the net load is zero. For this reason, no credit was given to storage for canopy over impervious land uses.
- Bill Keeling had to leave the call, but before doing so emphasized that a decision made did not have the consensus of the full representation of the Modeling WG.
- Olivia explained the different tree canopy land uses as well as calculation examples for different parameters.
- Loading rates have already been approved by the Urban Stormwater WG, as well as the others brought up in Justin's presentation.
    - However, the watershed technical and land use workgroups were not explicitly asked for approval.
- Dave pointed out that if those groups that are primarily responsible for the loading rates have signed off already, then the threshold for this group to not endorse is probably very high. Lee concurred, asking if the Modeling WG could see any major flaws in what had been presented
- Norm elucidated some of the fatal flaw analyses undertaken by the Urban Stormwater WG, but noted that none could be found. Consensus was therefore reached in those groups. Additionally, some of the questions that were asked by Bill Keeling were also asked at other workgroups and expert panels and were deemed non-problematic.

- It is also worth noting that the total load from developed land uses will not change, but will simply move around among different land uses within the developed category
- The Modeling WG leadership noted that they would let Bill Keeling know the Modeling WG's final decision in deferring to other workgroups. Those present at the decision point in the meeting recognized that there was not consensus, but also determined that there were no fatal flaws.
    - George Onyullo commented that there may be fatal flaws and that the Modeling WG was deferring to the original group because there was not enough information to determine whether there were any fatal flaws.
    - Jeremy Hanson noted that there is extensive documentation, and Lee expressed questions regarding why the Modeling WG was weighing in on the matter.
- There were no outright objections to the application of what was presented in the Beta 2 WSM, and a decision was reached that the Modeling WG found no problems in this and would defer to other workgroups.

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