Modeling Quarterly Review Meeting
December 11th, 2013
http://www.chesapeakebay.net/calendar/event/18877/

UPCOMING MEETINGS

January Modeling Quarterly Review
Date: January 7th and 8th, 2013
Time: 10:00AM – 3:00PM
Location: Joe Macknis Memorial Conference Room (Fishshack) CBPO 410 Severn Avenue Annapolis, MD
Conference Line: 1-866-299-3188 code 267-985-6222
Adobe Connect: https://epa.connectsolutions.com/modeling/ (enter as guest)
Event webpage: http://www.chesapeakebay.net/calendar/event/21182/

MINUTES DECEMBER 11th, 2013

Preparing for a Simulation of Forest Disturbances – Angelica Gutierrez–Magness
Attachment A

Angelica Gutierrez presented the status of estimates of disturbed forest area due to silviculture, insect defoliation, drought, and other disturbances over time. Ultimately, an annual time series of the area of forest disturbance in each of the WSM land-river segments could provide the basis for improving Watershed Model performance through refinement of seasonal and inter-annual variability of forest nutrient and sediment loads. A statistical analysis between the new satellite data and the HSPF calibration run was presented.

Discussion and Questions

- Status of the project: Can obtain time series data at the sub-watershed scale, analysis is compete, model is operational, and now the project is in the publication stage.

- This project can inform the Chesapeake Bay Program Watershed Model in a couple different ways:
  - Use time series of nitrate produced to calibrate the model.
  - Build in forest sensitivity to defoliation events.

- If this is incorporated, urban forest will be a separate land-use.

- Lindsey Deel's work is the raw data that is used to apply the algorithm. CBP will need this data to apply the sensitivities.

- **ACTION**: Angelica Gutierrez-Magness is the contact if the Modeling Workgroup is interested in using this information in the Phase 6 sensitivity and calibration.

- Does the watershed size affect the modeling? The analysis includes sub-watershed areas from 0.6 square miles to 2500 square miles, but because the majority of the land-use was forested that was the most important factor and we are confident that we are able to extract the forest signal from the total load.

- Defoliation will included in the proposed harvested forest land use. As of now there is not a way to distinguish between harvested forest and other disturbances. To incorporate this analysis, disturbed land and harvested land will be the same land-use in the WSM, but if it is necessary we can have two separate land-uses that have the same sensitivity for nitrate and different sensitivities for phosphorus.

Phase 6 Sensitivities Overview – Gary Shenk
Attachment B

Gary Shenk provided an overview of the ongoing work to develop an all-PQUAL based Phase 6 Watershed Model. With the previously reviewed application of refined precipitation inputs and with the new sediment calibration techniques presented today the outlines of the Phase 6 Watershed Model are beginning to take shape.

Discussion and Questions

- Plans for the future:
    - Continue to gather information
        - AGCHEM – CBPO
        - SPARROW – CBPO
        - CEAP – BARC
        - Forest Disturbance model – Gutierrez-Magness, et al.
        - APLE – Coale and Mulkey
        - Other coefficient models – TetraTech
        - Literature – TetraTech
    - Synthesize and discuss with the Modeling Workgroup
    - Next step – Incorporate sensitivity into PQUAL

- **ACTION**: At the April Modeling Quarterly, the Modeling Team will present a Phase 6 PQUAL prototype. The sensitivities that are presented are not the final sensitivities.

Extension of the WSM to 2011 – Gopal Bhatt

Attachment C

Using the extension of the Watershed Model from 2002 to 2012 with the new NLDAS precipitation input, Gopal Bhatt described a refined calibration approach for sediment that will improve attainment of expected sediment targets now provided by NRI RUSLE estimates.

Discussion and Questions

- Was potential evapotranspiration (PET) changed to the Penman-Monteith approach?
    - No, the WSM is still following the Hamon method, which is temperature and daylight based, but the output of PET values were improved because of the change in the daylight hour data with the new data set.
    - Considering climate change efforts, the Penman-Monteith approach includes the relative humidity and carbon dioxide, so this group may want to consider options for including this in the WSM.
        - Must consider whether or not it is feasible to switch to the Penman-Monteith approach. A past version of the WSM used the Penman-Monteith approach, but it was switched to Hamon because the Modeling Team initially found that the spatial coverage in temperature was there, but not the other variables that were needed to the Penman-Monteith. If this is still the case, one proposal could be to continue to use Hamon to set the base and then for climate change consider the particular things that change in the Penman-Monteith.
    - The data collection in the river in the states has been upgraded to be the same as what is collected at the RIM stations. Also currently improving the storm weighted data. Storm sampling is growing at about 5 stations per year, with the plan to include it at all stations.

- As improvements are being made, shouldn't the Modeling Workgroup be incrementally documenting the progress? For example, use the 1985 – 2005 NLDAS data to calibrate the Phase 5.3.2 model.
    - Re-calibrating the Phase 5.3.2 model with the NLDAS data would require a couple months time (at least 6 person weeks). Re-calibration going forward will be easier because the process is more automated. Moving forward with the NLDAS data was decided because it calibrates the hydrology as well or better and it is available into the future. But the point is well taken, that to the extent that we can, this group should be incrementally document the progress.
    - **ACTION**: Another suggestion is to calibrate the PQUAL using both rainfall data sets and compare those models.

- SLIDE CORRECTION: Slide # 14 titles of the tables are switched. R-squared is the bottom table and slope is the top table.

- **ACTION**: At the April Quarterly Meeting, the Modeling Team will present a suggested approach for PET in the Phase 6 hydrology.

- **ACTION**: One-to-one comparison between the XYZ and NLDAS 1985 – 2005 data.

Potential of Seasonal Factors to Adjust Baseflow Concentration – Ross Mandel
Attachment D

Ross Mandel reviewed the potential of observed seasonal baseflow concentrations in Phase 6 as a replacement of the regional factors and described plans for assisting in development of aspects of the Phase 6 Model.

Discussion and Questions

- If there is interest, Ross Mandel can provide the ambient mean slides. Note that this is an exploratory tool.

- It was suggested that if there is more data and more storm samples, it may necessitate changing the in-stream calibration, so that it reflects samples that were taken in wet weather vs. dry weather.

- Gary Shenk suggested that Ross Mandel talk to Joel Blomquist (USGS) about base flow issues.

- Even if the same method is used for calibration of Phase 6, the calibration factors (regional factors) can at least be improved by separating by flow and season.

- Explaining calibration factors (regional factors) is a difficult task. Is it helpful to have the calibration factors (regional factors), the same within counties? The calibration factors (regional factors) are affected by many different factors. But it seems like it is based on landscape and this needs to be investigated further.

- The process for Phase 5.3.2 included testing many theories and methods. The new SPARROW should be tested. SPARROW could be useful because it has land-use weights upstream with relative importance of different factors and sub-grid affects and therefore could possibly be used to inform the weighting method.
  - **ACTION**: Provide Ross Mandel with the new version of SPARROW and the Modeling Team will help with the implementation methods in order to start testing these things.

- **ACTION**: Prototype decision rules and methods for review by April Quarterly.

Chesapeake Modeling Lab Action Team Status – Pruzinsky

The status of the response to the NAS recommendation for a Chesapeake Modeling Laboratory was reviewed.

Discussion and Questions

- Draft document went out for review and MLAT leadership are reviewing the final comments.

- MLAT contacted the Communications WG and an editorial review has also been done.

- Mark Bennett will be finalizing the document next week and then sending it back out to MLAT.

- MLAT is scheduled to present to the Management Board at their January 2014 meeting.

- **ACTION**: The Modeling WG requested to see a preview of the MLAT Management Board presentation at the Modeling WG Quarterly Meeting in January 2014.

Overview of Phase 6 Status – Gary Shenk
Attachment E

Gary presented the overall status of the Phase 6 work relative to the WQGIT assignments and the Agricultural Modeling Workgroup.

Discussion and Questions

- The Modeling WG needs to be fully engaged and aware of the changing the partnership is suggesting for the Phase 6 Model in order to make sure that the Modeling WG/Team has the capacity and data to implement the changes quickly.

- Concern was expressed that uncertainty analysis and lag times were on the WQGIT priority list and not a priority on the Modeling WG list.
    - There was definitely discussion on how the Phase 6 Model would facilitate uncertainty analysis because it runs much faster and therefore there is more time for uncertainty analysis.
    - Messaging lag times will be a huge communication concern as we approach 2025.
    - The Modeling Workgroup will check on whether these are priorities on the WQGIT Mid-Point Assessment list.
    - The Modeling Workgroup requested that if the group has suggestions on how to approach these issues, they bring them forward.

Synthesis of Existing Modeling WG Work Plans – Linker
Attachment F – Modeling WG work-plan presentation
Attachment G – Midpoint Assessment schedule
Attachment H – RFP: Evaluation of Multiple Shallow-water Systems and Analysis

The existing approved work plans on climate change, Conowingo infill, filter feeders, James chlorophyll, shallow water dynamics, and the Water Quality and Sediment Transport Model will be combined with the Phase 6 work plan into an overall plan and timeline.

Discussion and Questions

- Modeling Workgroup members were asked to review the Midpoint Assessment priorities and contact Lewis Linker with any comments, questions, or concerns.

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