Modeling Workgroup Conference Call
July 9, 2015
1:00 PM – 3:30 PM

For Remote Access:
Adobe Connect: https://epa.connectsolutions.com/modeling/ (enter as guest)
Conference Bridge: 1-(866)-299-3188 code 267-985-6222#
Event webpage: http://www.chesapeakebay.net/calendar/event/22833/

DRAFT AGENDA

Announcements and Amendments to the Agenda – Lee Currey, MDE and Dave Montali, WVDEP

SAVE THE DATE:

- July Modeling WG Quarterly – July 21-22.
- An agenda will be put out for members and participants on the meeting website.
- Results from the Phase 6 prototype will be brought back to the workgroup at the quarterly meeting.
- Source sector chairs meeting with the Modeling WG leadership is currently planned to be held in late July.
- Minutes from the June Modeling WG conference call have been posted to the meeting website.
- There is a request for proposals from the WQGIT that would support the activities of different workgroups. Last year the Modeling WG successfully submitted a proposal for SLR and loss of wetland attenuation. The maximum project amount is set at $140k. Proposals are welcome from all members of the Modeling WG.
    - One example idea in the works is a project for a prototype watershed distributed model. This prototype would cover a watershed of moderate size like the Patuxent or the Shenandoah.
    - Proposals should be submitted to Lee, Dave, and Lew.

Phase 6 Application of Flood Plain and Bank Estimates of Nutrient and Sediment Loads – Gary Shenk, USGS-CBPO
Attachment A

- Gary reviewed how new science is being incorporated into Phase 6, the processes that are being developed, and their places within the model.
- A wiring diagram that shows all the different processes within Phase 6 was also presented, outlining what is expected to be developed over the next months and year.
- The “no default” label indicates points for which there is no preliminary information and are necessary to run the model.

Estimating the Sediment and Nutrient Balances of Chesapeake Streams and Rivers - Greg Noe, USGS
Attachment B

- Greg presented new research being used to measure and make predictions of fluxes of nitrogen, phosphorus, and carbon with stream erosion and floodplain deposition across the watershed.
- On average for the entire Bay watershed, about 80% of phosphorus and 30% of nitrogen is associated with sediment.
- Several studies have been conducted in an attempt to determine the water quality functions of floodplains and the rates of N and P trapping and release in watersheds.
- There are attempts to better quantify the fluxes of floodplains and bank erosion by measuring the site sediment balance. This is equivalent to the flux of sediment associated with floodplains minus the flux of sediments associated with erosion. Above the dotted line, the rate of floodplain deposition exceeds the rate of bank erosion for that reach while below the dotted line the opposite is occurring.
- Currently, the goal is to measure and predict the associated N and P balance of associated rivers for the entire CB watershed. In some reaches predictions of a sediment balance can be obtained as well. Based on the methods, data collection are restricted by land uses (which must be unmanaged) and the floodplain.
    - A dendro-geomorphic technique is being employed in these efforts, wherein tree and shrub roots are used as an indicator for floodplain deposition and erosion.
    - With data, maps of hotspots of deposition and erosion can be created, allowing for predictions of sediment loss throughout the watershed.
    - The goal is to eventually develop a number quantifying Mg of sediment, P, and N being exchanged across the watershed.
- A point of future work will involve refining the model such that it captures the relative bioavailability of nutrients in the soil, since TN (currently being used) may not be the best indicator. Presently, the underpinning of current methods has taken precedence.
- There is further work on ways to improve the model correlations that have been attempted, stepwise correlation methods being used may be problematic in this instance. All nine regressions shown will be automated soon for GIS and will use the GIS toolkit that Peter is developing.
- When reaches reach a confluence, the whole watershed area above the measured reach is used in the calculations.
- Does the limitation of sampling sites hinder the method's applicability to other watersheds?
    - It is the land use on the floodplain itself, not the watershed land use that is an issue in moving forward to a broader scale of method application. Comments and discussion on how to best approach the problem are welcome.
- Would there be any value in being able to discriminate phosphorus content in different areas through which streams are flowing?
    - At every site measurements of total phosphorus of both the floodplain and bank are being taken separately. There are wide variations of floodplains widths that are being measured.

- As a stand-in for the Modeling WG's limited timeframe, average rates could be used as a starting point before there exists a discretized measurement for every reach.

Spatial Data Development for Estimating Sediment and Nutrient Balances of Chesapeake Streams and Rivers – Peter Claggett, USGS-CBPO
Attachment C

- Peter reviewed the development of a GIS tool that would automatically extract geofluvial features and measurements that were also being used to determine floodbank erosion and deposition. He also highlighted issues determined in attempting to develop this tool for application to the entire watershed.
- Additional corrections to the DEM have also been undertaken in an attempt to automate the tool in use.
- The goal is to complete all HUC-8s in the Piedmont watershed, as well as valley and ridge watersheds, in order to complement Greg's work
- N and P currently in the model is based on SPARROW, sediment is based on P5 from calculation based on a calibrated value. What could be done for the coastal plain in terms of estimates by October 1 for the entire watershed?
    - For Greg Noe's work, fieldwork is scheduled through early September, and there is no way that estimates for N and P could be delivered by the 10/1 deadline.
    - However, extremely preliminary estimates for sediment could possibly be provided by the deadline.
    - No measurements are being made in the Appalachian Plateau.
- **ACTION**: Further discussion about potentially bringing in a partial inclusion of the data by the model's October deadline, to be expanded watershed wide in 2016. Nutrients could be compared further down the road.
- Bay watershed model is calibrated to different species of nutrients, not just TN or TP. We're trying to further understand where sources exist in the watershed. Hopefully the tools can help to identify the hotspots, but falsely identifying these hotspots should be absolutely avoided.

Phosphorus Sensitivities for July Phase 6 Model Prototype – Guido Yactayo, UMCES-CBPO
Attachment D

- Guido presented sensitivity analyses generated using the APLE model.
- Inputs come from various sources, including HSPF simulations (erosion) and the XYC dataset (precipitation). The second set of inputs come from Scenario builder, and include fertilizer and manure applications.
- Sensitivity is a regression slope between the change in input and the change in output. The relative sensitivity provides information regarding how sensitive the model is to a change in a parameter.
    - The slope of the regression tells us that for an additional pound of input, you get an output in pounds equal to the slope.
    - In runoff, for every additional inch in runoff, x lbs (equal to the slope) of output are produced.

- How do we set parameters for different scenarios, particularly Mehlich?
    - Begin by calibrating the initial part, and produce a time series of Mehlich values. When the what-if scenarios are reached APLE will need to be run out into the future to obtain different Mehlich values. There is a temporal dimension to scenarios that phosphorus makes us ask, specifically what question are we trying to answer?
    - One of the next steps will involve breaking out county-wide Mehlich values throughout the watershed

Progress in the development of the Phase 6 July Prototype Model – Gopal Bhatt, PSU
Attachment E

- Gopal presented updates regarding Phase 6 Model development and discussed prototype-I. This is a progress update leading up to a fuller, more detailed presentation at the July quarterly meeting.
- Gopal also reviewed the evolution of the Phase 6 model, and the input parameters associated with model development.
- Performance is similar to what has been seen with previous prototypes, like that presented at the April Modeling Quarterly Meeting.
- Eventually the use of sediment export targets will change, and will be the average annual export rate over the entire calibration period, from 1985 to 2014.
- **ACTION**: Gopal will create boxplots with KSS statistics and other visualization methods to better relay the improvements made in the Phase 6 model.

Meeting Attendance

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