



Proposed Phase 6 Models Fatal Flaw Strategic Review Process

**Chesapeake Bay Program Partnership's
Agriculture Workgroup**

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Background

- In establishing the overall schedule for the 2017 Midpoint Assessment, the Partnership agreed to:
 - Year long review of Beta versions of the Phase 6 suite of models
 - Fatal flaw review following final model calibrations
- Partnership agreement on devoting 2 months to the fatal flaw review
- WQGIT and Modeling Workgroup reviewing what constitutes of fatal flaw in the models
- WQGIT chair asked for a more comprehensive approach to the model review

Prior to/Going into Fatal Flaw Review

- Scheduling webinars explaining each of the models with a focus on critical components
- Access to full model documentation
- Development of new/enhancement of existing model review tools
- Responses to key recommendations from STAC Model Uncertainty Workshop
- Dividing up and assigning responsibilities

Dividing Up and Assigning Responsibilities

- By source sector/technical workgroup
 - Modeling Workgroup
 - Watershed Technical Workgroup
 - Land Use Workgroup
 - Agriculture Workgroup/Ag Modeling Subcommittee
 - Urban Stormwater Workgroup
 - Forestry Workgroup
 - Wastewater Treatment Workgroup
- By Partnership model
 - CMAQ and Penn State Airshed Models
 - Phase 6 Chesapeake Bay Watershed Model
 - Chesapeake Bay WQ/Sediment Transport Model

Agriculture Modeling Subcommittee

- Review watershed model documentation chapters 3 and 6
- Compare the Scenario Builder (SB) edge of small stream (EOSS) simulated loads versus downstream delivered load calibration results for agriculture dominated watersheds
- Review the interconnecting steps (without BMPs) in the simulation of transport of nitrogen (then uniquely phosphorous, and then sediment)— from SB crop inputs, SB logic, load targets, atmospheric N, soil P—to EOSS calibration

Agriculture Modeling Subcommittee

- Review EOSS simulated impacts and calibration sensitivity analyses based on running model responses to individual agricultural BMPs and multiple stacked BMPs in the initial sensitivity analyses conducted by the Modeling Workgroup
- Brief the Agriculture Workgroup on findings from all the above analyses and evaluation as well as the ranging scenarios (e.g., All Forest, 1985, Phase II WIPs, E3, others) run through the calibrated Phase 6 models

Watershed Model Review Tools

- Expand existing Tableau watershed model input data review tool to now include:
 - Functionality for evaluating outputs, making cross comparisons all the way down to the individual county scales
 - Break out the incremental loads, for the appropriate scales, on the ‘way to delivery to tidal waters’—edge of small streams, larger rivers, and delivered to tidal waters—so that the progression of attenuation can be viewed and understood
 - Charting capacity to easily cross compare from one county to another, from one watershed to another

Watershed Model Review Tools

- Expand existing Tableau watershed model input data review tool to now include:
 - Provide for the ability to compare relative loads across source sectors by major land uses
 - Expand years beyond just the calibration period—need to be able to view calibration data/early ranging scenario results for the entire record 1985-2016
 - Build off the county level framework that Sucharith Ravi has already set up
 - Set up ability to conduct comparisons of model simulated loads from the Phase 5.3.2 and Phase 6 approaches to simulating nutrient management

Watershed Model Review Tools

- Build into the CAST user interface the ability to easily and rapidly run a series of sensitivity scenarios to fully understand the model's responses to individual BMPs, stacked BMPs as well as varying model inputs such as fertilizer and manure applications
- Expand the comparison of USGS's WRTDS calculated loads with Phase 6 watershed model simulated scenario loads to include all monitoring stations with a sufficient temporal record of observations

Watershed Model Review Tools

- Generation of summaries of the extensive and detailed calibration data analyses (50+ pages of calibration documentation per station) at scales of interest to the jurisdictions
- Expand the capability to geographically map out/visualize watershed model calibration outputs and the outputs of early ranging scenarios at the full range of spatial scales supported by the model and enable side by side comparisons between different scenarios

Process for Cataloging and Resolving Identified Issues

- Communicate all identified model calibration issues directly to the appropriate CBPO Modeling Team lead for cataloging:
 - Gary Shenk: watershed model
 - Lew Linker: water quality sediment transport model
 - Lew Linker: airshed models
- Gary/Lew will then assign each issue to the appropriate technical support/source sector workgroup or CBPO team for resolution
- Workgroup chair and coordinator assigned a model or calibration issue for resolution has the lead for confirming partnership support for the proposed resolution issue
- CBPO staff will document resolution of each identified model or calibration issue and subsequent workgroup/WQGIT concurrence

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