Phase 6 Review Structure and Schedule

Schedule

- Beta 1
  - release 1/4/16
  - inputs webinar 1/14/16
  - draft documentation 2/1/16
  - Webinar to AgWG 3/10/16
  - Webinar to ModWG 3/11/16 (?)
  - Comments due 4/11/16 (?)
  - STAC Peer Review of Phase 6

- Beta 2
  - Release 4/19/16
  - Documentation 5/1/16 (?)
  - Webinar 5/3/16 (?)
  - Comments due 6/3/16 (?)

- Beta 3
  - Release 7/12/16
  - Documentation 8/1/16
  - Webinar 8/1/16 (?)
  - Comments due 9/1/16

- Phase 6.0
  - MWG QR 12/10/16 (?)
  - Letter of approval to WQGIT 12/15/16
  - Release 1/3/2017
  - Documentation 1/3/2017
  - Webinar 1/12/2017

Webinar Structure

Webinars will generally follow the same structure. The first will be focused on the watershed model description with later webinars having more of a focus on agreement with data and responses to comments.

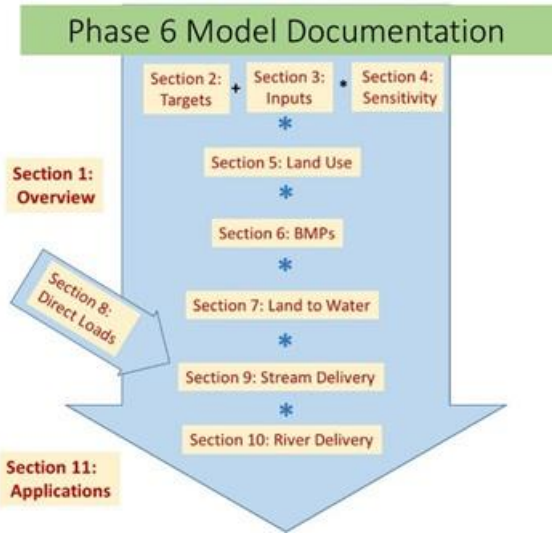
Note: this is meant to be a public document. Red Inked areas are additional detail for the MWG leadership and modeling team

- Introduction
  - Documentation status
  - Organizing Principles
    - Improved data for input (landuse, historic BMP clean up, poultry litter, new BMPs, biosolids)
    - Revise where necessary (geographic accuracy, Conowingo, phosphorus saturated soils)
    - Phase 6 is an evolution of Phase 5 - builds upon historic knowledge
    - The modeling system will adapt to change in data inputs through calibration to monitoring stations (including SPARROW derived targets)
    - Understanding Regional Differences rather than calibrating them through regional factors.
  - Responses to Previous Comments
- Watershed Model Description
  - Average Load
    - Global NPS load
    - Major land use breakout
    - Minor land use breakout
    - RUSLE2 or P5 sediment
  - Sensitivity to inputs
    - Nitrogen
      - Agreement among models
      - p5.3.2 sensitivities
      - Assignment to P6 land uses
    - Phosphorus
      - STAC recommendation for new approach
      - APLE for P5.3.2
      - Assignment to P6 land uses
  - Watershed Delivery of nutreints
    - Land to water
      - SPARROW factors for N and P
      - Normalization
      - Sediment interconnectivity or delivery factors
    - Stream Delivery
      - SPARROW stream factors
      - Small reservoir changes
      - Sediment stream balance or delivery factors
    - River Delivery
      - Delivery from land uses

        - UNEC
        - rSAS
        - Sediment improvement
    - River simulation and calibration
        - Extended time period
        - Storm Peaks
        - Lower Susquehanna and other reservoirs
- Calibration relative to concentrations and loads
    - Summary flow statistics
    - Summary of agreement between WRTDS and Phase 6 overall
    - Review particular stations of interest to your jurisdiction.
- Scenarios
    - Broad Scale – Relative ranking of scenarios
    - The aggregate effect of BMPs
    - The effects of inputs, such as land use, animal numbers, etc.
- Next Steps in the P6 Development
- Comment procedure

An approach to review the Watershed Model

- Read section 1 of the documentation to understand the overall structure
    - Determine the sections in the documentation that are most relevant to your work or interest in the Chesapeake Bay Program partnership.
- Review sections of interest to comment on
    - Quality of documentation
    - Overall concept used to calculate model values
    - Calculation methods used to determine model values
    - Data used
    - Long-term suggestions for future models.



- Review the calibration relative to concentrations and loads
    - Summary flow statistics
    - Summary of agreement between WRTDS and Phase 6 overall
    - Review particular stations of interest to your jurisdiction.
- Review scenarios
    - Broad Scale – Relative ranking of scenarios
    - The aggregate effect of BMPs
    - The effects of inputs, such as land use, animal numbers, etc.

Schedule of refinements

- Beta 1 -
  - First public release of fully constructed model
- Beta 2
  - Average Loads
    - Tree canopy targets
    - Ag P: new APLE runs and distinction between land uses
    - Based on monitored load rather than total load
    - New RUSLE2 estimates
  - Inputs – Updates for new coefficients
  - Sensitivity – No change
  - Land Use
    - removal of tree canopy over shrub scrub
  - BMPs – No change
  - Land to Water
    - Sediment Interconnectivity Factors
  - Direct Inputs – No Change
  - Stream Delivery
    - Incorporation of sparrow reservoirs
    - Stream Mass Balances for sediment
  - River Delivery
    - Better representation of high flow events
    - Improved representation of sediment and nutrient processes
    - Improved river calibration method
- Beta 3
  - Average Loads - TBD
  - Inputs
    - Atmospheric Deposition
    - Updates TBD
  - Sensitivity – TBD
  - Land Use – No Change
  - BMPs – TBD
  - Land to Water – TBD
  - Direct Inputs – TBD
  - Stream Delivery - TBD
  - River Delivery - TBD
- Final
  - Average Loads – New Loads based on updated land use and sparrow
  - Inputs – New inputs based on updated land use
  - Sensitivity – TBD
  - Land Use – Fine Resolution
  - BMPs – TBD
  - Land to Water – based on updated sparrow run
  - Direct Inputs – TBD
  - Stream Delivery – based on updated sparrow run
  - River Delivery – TBD

WQSTM: 2016 Review Structure and Schedule

- Key message: Current 2017 Midpoint Assessment version calibration results show that it is as good or better than the 2010 version used to establish the Chesapeake TMDL
- What has been updated since the 2010 WQSTM:
  - Time period has been extended and more stations and data included in calibration particularly for the shallow water monitoring stations
  - Improved Phase 6 input loads of nutrients and sediment.
  - Improved simulation of tidal water labile and refractory organics.
  - Inclusion of nutrient loads associated with tidal shoreline erosion.
  - Refined simulation of Lower Susquehanna reservoir system inputs from Conowingo infill.
  - Improved representation of shallow water.
  - Representation of tidal wetland attenuation of nutrients and sediment
  - Representation of increased temperatures and sea level rise due to climate change

- *Beta* 1 released January 4, 2016 for WQSTM input and calibration

  <u>WQSTM activities between *Beta* 1 and *Beta* 2 release:</u>
  - Continue calibration of WQSTM with *Beta* 1 inputs
  - Improve simulation of labile and refractory organics
  - Improve shallow water simulation.

- *Beta* 2 released 4/19/16 (one week before the April Quarterly Review on 4/26-27/16) for WQSTM input and calibration

  <u>WQSTM activities between *Beta* 2 and *Beta* 3 release:</u>
  - Continue calibration of WQSTM with *Beta* 2 inputs
  - Improve simulation of labile and refractory organics
  - Improve shallow water simulation.
  - Include representation of tidal wetland influence on nutrients and sediment.
  - Better representation of inputs from high flow events in Lower Susquehanna Reservoirs including improved representation of sediment transport in Lower Susquehanna reservoirs with HEC-RAS2.
  - Conowingo Pool sediment scour with improved representation of scoured organic loads delivered to the Bay
  - Initial preliminary management scenarios for comparison such as progress scenarios, applied as scoping scenarios in the WQSTM to gain insights into how the WQSTM responses to changes in nutrient and sediment loads.
  - STAC peer review of WQSTM in June, 2016.

- *Beta* 3 released 7/12/16 one week before the July Quarterly Review on 7/19-20/16 for WQSTM input and calibration

  <u>WQSTM activities between *Beta* 3 and Phase 6 Final release:</u>
  - Continue calibration of WQSTM with *Beta* 3 inputs
  - Representation of oyster aquaculture and sanctuaries

- Finalize wetland attenuation of nutrient and sediment loads,
- Finalize representation of sea level rise, temperature increases, and other climate change effects.
- Linking watershed and water quality model and beginning to show management scenarios with attainment results with the development of preliminary WQSTM with initial key scenarios of 1010 and 2013 Progress runs, No Action (high loads), All Forest (low loads), and WIP2 loads
- Report out on WQSTM STAC Peer Review
- December 16, 2016 Phase 6 final version loads sent to ERDC
- December 21, 2016 WQSTM fully operational on ERDC and RTP supercomputers
- Preparation for January 10-11, 2017 Modeling Quarterly Review
  - Explain revisions that have occurred through *Beta* versions
  - Apply metric of "As good or better than the 2010 version used to establish the Chesapeake TMDL"
  - Modeling Workgroup confirms that this model is ready to go because, metrics show reliability, improved Phase 6 inputs, STAC support, stakeholder support. Were ready to help inform policy. Let's go!