Modeling Workgroup Midpoint Assessment Priority Items

The Modeling Workgroup has identified the following priority items for the Midpoint Assessment process.

1. Revisiting the Watershed Model calibration with the goal of improving local watershed results.
2. Incorporating the revised Airshed Model into the watershed and water quality modeling framework.
3. Refinements to the Water Quality and Sediment Transport Model.
4. Extending the Airshed, Watershed and Water Quality and Sediment Transport model simulation period.
5. Revising the Partnership model system structure.
6. Development of a) the Midpoint Assessment technical tools schedule to identify critical path items and milestone dates, and b) integrate of the technical tool revision and Phase III WIP development schedules to achieve an effective balance between sufficient review time for tool revisions/review/concurrence and sufficient time for target development and implementation planning.
7. Engaging STAC.

While the above seven items represent broad topics, they allow the Modeling Workgroup to better identify its role in the Midpoint Assessment process. Regarding the technical tools, and giving consideration for a recalibration, the Modeling Workgroup is central to that process as all revised source sector inputs (or priorities from source sector workgroups) must be assimilated into the modeling system. More detailed information on these seven broad topics is presented below.

1. Revisiting the Watershed Model calibration with the goal of improving local watershed results.

- Goals
  - Improve local calibration results.
- Topics to Revisit
  - Revisiting regional factor estimation methods.
  - Consider inclusion of additional calibration data sources from literature and other modeling analyses (e.g. SPARROW).
  - Evaluate the use of NLDAS rainfall data as it compares to XYZ methods.
  - Calibration objective functions (e.g. flow quintiles, weighting).
  - Review calibration methods to determine the effect of the lag times.
- Communication
  - Transitioning model versions.
  - Explanation of calibration revisions.
  - Explanation of regional differences.

2. Incorporate the revised Airshed Model in the watershed and water quality modeling framework

- Goals
  - Refine and incorporate an updated Airshed Model (CMAQ) into the current modeling framework.

    - Better integration of state and federal air pollution controls to enable communication of state vs. federal strategies.
- CMAQ Refinement Topics
    - Update the wet deposition.
    - Refine bi-directional ammonia.
    - Update 2007 emissions/meteorology base to update the current 2002 emissions/meteorology base and consider including MARAMA regional inventory into the emissions inventory available from Research Triangle Park (RTP).
    - Develop a new library of CMAQ Scenarios, i.e., current conditions, 2025, 2030, maximum feasible.
- Communication
    - Improve communication with state air quality State Implementation Plans (SIPs) counterparts about emissions and modeling.

3. Refinements to the Water Quality Sediment Transport Model

- Goal
    - Improve the estimate of hypoxia/anoxia and SAV/clarity in the Bay, which is expected to result in an improved simulation of the TMDL endpoint for dissolved oxygen.
- Topics
    - Represent shallows and embayments with a finer grid, perhaps with a ribbon model, perhaps with finite volume grid to better represent clarity SAV and open water DO, and perhaps augmented with multiple models to improve calibration.
    - Improve simulation of estuarine wetlands.
    - Examine the simulation of sediment diagenesis with scour, resuspension, fate, and transport of organic material.
    - Develop process to integrate local results from fine scale models (e.g. James River).
    - Expand assessment with oyster and menhaden filter feeder simulations.

4. Extending the airshed, watershed and water quality sediment transport model simulation period

    - Revise/revisit precipitation input for ability of near time load estimates.
    - Extend calibration period beyond 2005 to get more observed data and more recent data, particularly for shallow water monitoring that came on line from 2003 forward and the more recently established monitoring stations in the watershed.

5. Revising the Partnership Model System Structure

- Goals
    - Separate the research and operational models to increase partnership ability to efficiently run scenarios and provide flexibility to build upon current scientific knowledge.
    - Include information from other models in the estimation of small-scale processes and BMP effects. These may include local-scale models, distributed models, regression models, or sector-specific models.

6. Development of 1) the Midpoint Assessment technical tools schedule to identify critical path items and milestone dates and 2) integrate of the technical tool revision and Phase III WIP development schedules to achieve an effective balance between sufficient review time for tool revisions/review/concurrence and sufficient time for target development and implementation planning.

- Goals
    - Develop "continuous" review process of model refinements which allows interaction with the Partnership.
    - Set realistic expectations on the number of possible model revision iterations given allowable timeframe.
    - Consider a formal and final review of next phase of models prior to use in Phase III WIPs.
    - Develop objective criteria that would define the need to transition to a revised model for use in Phase III WIP.
    - Modeling delivery date from WQGIT
    - Resolve current disconnect between the 2017 progress run scenario completion date and the Phase III WIP development schedule

7. Engaging STAC

- STAC is a valuable resource that can help provide insight into and assistance with challenging issues. The Modeling Workgroup recommends the current topics.
- Topics
    - Phase III WIP Watershed model review – The Phase 5 Model structure was reviewed by STAC. Part of this process identified key questions such as local applicability. The Modeling Workgroup proposes to engage STAC again to address similar questions, such as Phase III WIP development scale, but also add topics such as communication through model refinement process.
    - Initiate a STAC Workshop on Climate change - While there is a significant amount of research surrounding climate change, the Modeling Workroup's recommendation is that a consolidation/coordination of the work as it relates to the Bay is necessary.