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 which allows for extension of the Watershed and Estuary Model time period and provides increased accuracy of ammonia simulation and updating its meteorology and emission inputs.
3. Extending the Estuarine Model time period to allow inclusion of more locally available information with the expectation of increased local accuracy.
4. Revising the partnership model system structure to facilitate the application of multiple models which allow integration of operational and research models. This will increase partnership ability to run scenarios and allow flexibility to build upon current scientific knowledge.
5. Development of the midpoint assessment technical tools schedule to identify critical path items and milestone dates.
6. Engaging STAC on critical issues. These include increased coordination on the science related to climate change, a formal review of recalibrated models with an emphasis on communication through model transitions.

While the above six items represent broad topics, they allow the Modeling Workgroup to better identify its role in the Midpoint Assessment process. Regarding the technical tools and 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 six broad topics is presented below.

1. Revisiting the Watershed Model Calibration

- Goals
    - Improve local calibration results
    - Extend model to allow model simulations to include near time (previous year) and to make use of more recent observed data system-wide and particularly the observed data from more recently established monitoring stations
- Topics
    - 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
    - Develop objective criteria that would define the need to transition to a revised calibration
    - Inclusion of CMAQ revisions
- Communication
    - Transitioning model versions
    - Explanation of regional factors

2. Incorporating the revised Airshed Model

- Goals
    - Application of updated Airshed Model (CMAQ) into current modeling framework
    - Better integration of state and federal air and water pollution controls to enable communication of state vs. federal strategies
- Topics
    - Update the wet deposition model from current 1985-2005 to ~1980 to 2012 or beyond.
    - Include CMAQ Model refinements of bi-directional ammonia.
    - Develop a new 2007 emissions/meteorology base to update the current 2002 emissions/meteorology base, using the updated MARAMA regional inventory.
    - New library of CMAQ Scenarios of: - Current Conditions - 2025 - 2030 - Maximum Feasible.
    - Communicate with state air quality State Implementation Plans (SIPs) counterparts about emissions and modeling.

3. Extending the Estuarine Model

- Goals
    - Improve calibration in local embayments
    - Develop process to integrate local results from fine scale models (e.g. James River)
    - Improve simulation of estuarine wetlands
    - Full sediment diagenesis with scour, resuspension, fate and transport of organic material
    - Refined chlorophyll simulation and assessment particularly in the James with linkage to James Model.
    - Expand assessment with oyster and menhaden filter feeder simulations.

- Topics
    - 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.
    - 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 with multiple models.

4. **Revising the Partnership Model System Structure**

- Goals
    - Application of multiple watershed models to allow integration of operational and research models into the partnership model. This will increase partnership ability to run scenarios and allow flexibility to build upon current scientific knowledge.
- Topics
    - 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.
    - Revisit AGCHEM vs. PQUAL for use in operational model

5. **Developing the Midpoint Assessment Technical Tools Review Schedule – Calibration and the critical path**

- Background
    - The Watershed Model calibration process takes about 5 days for hydrology and about 2 weeks for Water Quality Model. Once the calibration is complete time needs to be allowed for processing, review, presentation and suggested revision. In total, each recalibration "iteration" will like take about 6 months.
- Critical path items for model recalibration
    - Inputs from source sector workgroups
    - Rainfall
    - Improvement of key calibration issues
    - Revising model structure
    - Airshed Model revision
    - Modeling delivery date from WQGIT
- Goals
    - Develop "continuous" review and development schedule that allows interaction with the source sector WGs and communication to WQGIT
    - Set realistic expectations on the number of possible iterations given allowable timeframe
    - Communicate review process
- Issues for WQGIT
    - The integration 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
    - An end date for the tool revision process is needed
    - Clear communication that modeling revisions prior to the Phase III WIP process are limited to those that can reasonably accomplished by the deadline in a scientifically sound manner

6. 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
    - 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. This item is related to principle 4, emerging issues.
    - 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 proposed to engage STAC again to address similar questions but also add topics such as communication through model recalibrations. This item is related to principle 2.