Review of Modeling Workgroup Priorities

Modeling Quarterly Review
04/01/2014

Modeling Workgroup Priorities

Watershed Model

- Revise Watershed Model system structure
- Revisit Watershed Model calibration methods, including regional factors

Water Quality and Sediment Transport Model

- Refine and update the Water Quality and Sediment Transport Model (WQSTM)
- Refinement of shallow water simulation for improved assessment of open water DO and SAV/clarity standards

Airshed Model

- Update Airshed Model to new CMAQ Bidirectional Ammonia Model

TMDL Charges

- Effects of Conowingo infill on Chesapeake Bay WQS
- Examine the influence of climate change (CC) on Chesapeake WQ standards and the 2010 Bay TMDL
- Review James River chlorophyll criteria and James River TMDL allocations
- Influence of oyster filter feeders on water quality, with increased aquaculture and sanctuary development

STAR Requests

- Assess and Explain Water Quality Trends

Modeling Workgroup – Work Plan 01/23/2014

Update Airshed Model to new CMAQ Bidirectional Ammonia Model

- Office of Air Quality Planning and Standards (OAQPS) provides bidirectional Ammonia CMAQ simulation scenarios. CMAQ scenarios with bidirectional ammonia simulation developed through 2014-2015. By December 2015 all CMAQ Airshed scenarios will be in place.

- Relevant meeting presentations:
  - Dennis – Developing Oxidized Nitrogen Atmospheric Deposition Source Attribution from CMAQ for Air-Water Trading for Chesapeake Bay 07/24/2013

Revise Watershed Model system structure

- A Phase 6 Watershed Model based on the HSPF PQUAL simulation and with an updated precipitation input dataset, hydrology, and sediment simulations.

- Relevant meeting presentations:
  - Gopal Bhatt – Phase 6 Prototype 04/01/2014
  - Guido Yactayo – Further Analysis of Phase 6 Nutrient Sensitivities 04/01/2014
  - Pete Kleinman – Examination of Watershed Phosphorus Simulation Approaches 04/01/2014
  - Fraley-McNeal and Christianson – Relative Importance of Upland and In-stream Sediment and Nutrient Sources 04/01/2014
    - Technical Memorandum (03/25/14) Analysis of Stream Sediment Monitoring
    - Technical Memorandum (03/25/14) Analysis of Stream Sediment Studies
  - Alisha Mulkey – APLE Phosphorus Model 04/01/2014

Revisit Watershed Model calibration methods, including regional factors

- Revisit Watershed Model calibration methods with the goal of improving local watershed results, including revisiting regional factors.

- Relevant meeting presentations:
  - Ross Mandel – Refinements to Phase 6 Calibration Decision Rules 04/01/2014
  - Gopal Bhatt – Phase 6 Prototype 04/01/2014
  - Gary Shenk – Implementation of Expert Panel Recommendations 04/02/2014

Refine and update the Water Quality and Sediment Transport Model (WQSTM)

- CoE Engineering Research and Development Center (ERDC) develops and applies WQSTM. WQSTM development is ongoing until December 2015 followed by review and application during 2016-2017.

- Relevant meeting presentations:
  - Brady and DiToro – TMDL Models Representation of the Nutrient Loading – Hypoxia 04/02/2014
  - Cerco – Extension of the WQSTM to 2011 and Shallow Water Assessment Plans 01/07/2014

Refinement of shallow water simulation

- Funding has been identified for multiple modeling in shallow-water. RFP has been awarded and work is to begin in 2014. Comparison of different models applied to shallow-water systems will result in a model representation of shallow-water regions in WQSTM.

- Relevant meeting presentations:
  - Linker – Multiple Model Assessment of Shallow Water System 04/02/2014
  - Carl Cerco – WQSTM Shallow Water Simulation 04/02/2014

Effects of Conowingo infill on Chesapeake Bay WQS

- This work includes applying the results from the Lower Susquehanna River Watershed Assessment study, as well as work to provide land use characterization of small impoundments and associated drainage area.

- Relevant meeting presentations:
  - Lewis Linker – Progress on Lower Susquehanna Dams 04/02/2014
  - Robert Hirsch – Observations about the changing behavior of the Susquehanna River at Conowingo, MD 01/07/2014
  - Carl Cerco – Lower Susquehanna River Watershed Assessment 01/08/2014

Examine the influence of climate change (CC) on Chesapeake WQ standards and the 2010 Bay TMDL

- Many climate change studies will provide input:
  - Robust Decision Making (RDM) Analysis
  - Penn State analysis of climate change
  - UMD analysis of climate change impacts on Patuxent watershed and estuary
  - USGS analysis of Chesapeake watershed hydrology under future climate change conditions
  - JHU analysis of CC effects on observed trends in CB watershed
  - UVA analysis of CC

- Relevant meeting presentations:
  - Jennifer de Mooy – Delaware Climate Change Impact Assessment 01/08/2014
  - Sarah Ahmed – Potential Impacts of Climate Change on Washington Metropolitan Area Water Supply 07/23/2013
  - Susan Julius and Tom Johnson – Evaluation of RDM for Chesapeake Bay Water Quality Decision-making Under Uncertainty 07/23/2013
  - Maria Herrmann – Climate Change Forcing Functions 07/23/2013
  - Robin Dennis – Considering Climate Change in the CMAQ Simulation System 07/24/2013
  - Ping Wang – Assessment of the influence of sea level rise in the Chesapeake Bay 07/24/2013

Review James River chlorophyll criteria and James River TMDL allocations

- The VA DEQ is now undertaking a review of the CHLa standards and associated modeling framework. This effort will provide the scientific basis for a potential water quality standards rulemaking process, which may result in revisions to nutrient allocations contained in the Chesapeake Bay TMDL.

- Relevant meeting presentations:
  - Arthur Butt – James Chlorophyll Update 01/02/2013
    - Arthur Butt – James River CHLa Study – 2012 Summary and 2013 Research 07/25/2013
    - Executive Summary – First Year Findings from the James River Chlorophyll-a Study 07/15/2013

Influence of oyster filter feeders on water quality, with increased aquaculture and sanctuary development

- The oyster model will be revised as necessary to incorporate aquaculture operations and additional oyster biomass brought about by restoration activities including sanctuaries. Current and projected data on biomass distribution and abundance will be mapped onto the current computational grid and various combinations of restoration and load reductions will be examined. The oyster analysis is planned for the 2014 calendar year.

- Relevant meeting presentations:
  - Jeffrey Cornwell – Oyster Restoration, Aquaculture, and Nitrogen Removal 04/02/2014
  - Carl Cerco – Oyster Simulation 04/02/2014

Assess and Explain Water Quality Trends

- The activities described in this work plan will provide an integrated assessment and explanation of changes in watershed and estuary water-quality monitoring information. The five major work elements are:
  - Analyze trends of nitrogen, phosphorus and sediment in the watershed.
  - Enhance approaches using tidal monitoring data to assess attainment of water-quality standards.
  - Explain water-quality trends in Bay and its watershed.
  - Use improved understanding of trends to enhance CBP Models.
  - Synthesize and communicate results and implications for the TMDL.

- Next Steps:
  - STAC Workshop – Enhancing Approaches to Explain Management Effects on Water Quality Trends 03/25/2014 – 03/26/2014

Communications Strategy

Communication Strategy

- Weekly Modeling Team Meetings
  - Discuss Scenario Builder and Phase 6 Issues and identify decisions that must be made by the partnership.
- Monthly Modeling WG conference calls
  - Identify and make key decisions related to modeling on the workgroup priorities.
- Monthly Updates to STAR and WQGIT
  - Meeting minutes briefing prepared for STAR/WQGIT to communicate progress on Midpoint Assessment priorities.
- Quarterly two day review
  - Provide a briefing to the partnership on all Modeling WG priorities.

Monthly Modeling WG Conference Calls

- 2-hour Monthly Modeling Workgroup Conference Calls
  - Purpose: Identify and make key decisions related to modeling on the workgroup priorities.
    - These conference calls will NOT occur during months where there is a Modeling Quarterly and will ONLY occur if WG members are needed to make key decisions.
    - On monthly conference calls, as in the Quarterlies, we work for consensus with all. But major decisions are voted on by members only.
  - Dates: 1st Thursday of the month 10AM – 12PM