Review of Modeling Workgroup Priorities

Modeling Quarterly Review
01/14/2015

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

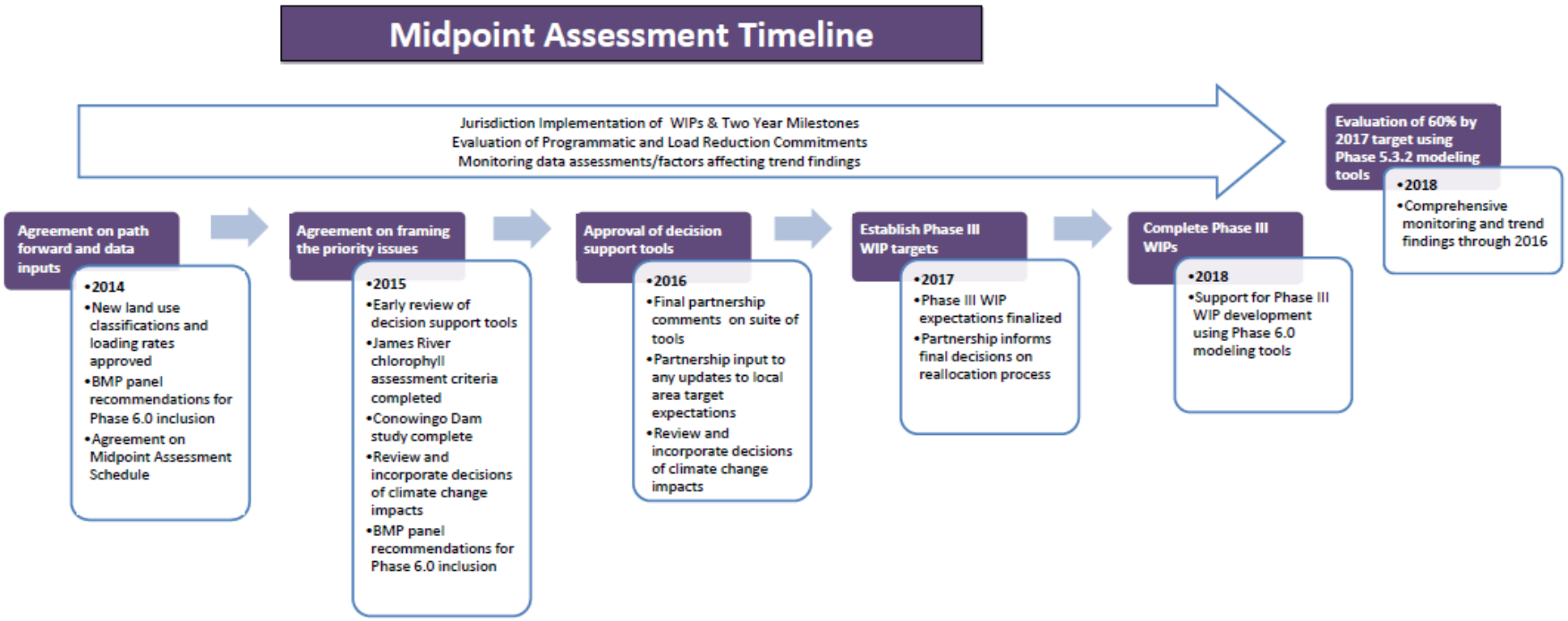
- Effects of Conowingo infill on Chesapeake Bay WQS
- Examine the influence of climate change (CC) on Chesapeake WQ standards and the 2010 Bay TMDL
- Review James River chlorophyll criteria and James River TMDL allocations
- Influence of oyster filter feeders on water quality, with increased aquaculture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

STAR Requests

- Assess and Explain Water Quality Trends

Scenario Builder and Watershed Model Plan for the MPA (tracking webpage)

Integrated with MPA Timeline



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:
  - CMAQ Air Scenarios – Jesse Bash and Robin Dennis (EPA-ORD) – 01/15/2015
  - Impact of Warming and Sea Level Rise on Chesapeake Water Quality – Ping Wang, VIMS – Lew Linker, EPA-CBPO – 01/15/2015

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:
  - Progress in Phase 6 Land Use/Land Cover – Peter Claggett, USGS – 01/29/2015
  - USGS' Dynamic Surface Water Extent (DSWE) project for quantifying surface water storage on the landscape – John Jones, USGS – 01/29/2015
  - Progress with Phase 6 Land Use Target Loads – Olivia Devereux, Devereux Consulting – 01/29/2015
  - Refinements to Phase 6 Land Segments – Howard Weinberg, UMCES – Peter Claggett, USGS – Gary Shenk, EPA-CBPO – 01/29/2015

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:
  - Representation of Storage and Lag Times in the Chesapeake Watershed – Ciaran Harman, Johns Hopkins – 01/28/2015
  - PQUAL Sensitivity to Inputs – Guido Yactayo, UMCES – 01/28/2015
  - Phase 6 Phosphorous Simulation: Role of APLE in Phosphorous Sensitivities – Guido Yactayo, UMCES – Gary Shenk, EPA-CBPO – 01/28/2015
  - Phase 6 Development Progress – Gopal Bhatt, Penn State – 01/28/2015
  - Progress in Replacing Regional Factors: A Multiple Model Approach Based – Ross Mandel, ICPRB – 01/29/2015

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:
  - WQSTM WQM progress – Carl Cerco, U.S. CoE ERDC – 01/14/2015

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:
  - Chester shallow water work – Richard Zimmerman, ODU – 01/14/2015
  - Chester shallow water work – Richard Tian, UMCES – 01/14/2015
  - WQSTM Shallow Water Simulation – Carl Cerco, U.S. CoE ERDC – 01/14/2015

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:
  - Ongoing Conowingo Studies – Bruce Michaels, MDDNR – 01/14/2015
  - Conowingo Infill Studies – Jeff Cornwell and Jeremy Testa, UMCES – 01/14/2015
  - Phase 6 Simulation of Conowingo Reservoir – Gary Shenk, EPA-CBPO – 01/29/2015

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:
  - Representation of Climate Change in the Chesapeake Watershed – Gopal Bhatt, Penn State – 01/15/2015
  - Representing Estimated Increased Storm Intensity in the 2050 Climate Change Simulation – Guido Yactayo, UMCES – 01/15/2015
  - Latest IPCC Downscaled Climate Change Scenarios – Venkataramana Sridhar and Choung Hyun Seong, Virginia Tech – 01/15/2015

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:
  - James Chlorophyll – John Kennedy, VADEQ – 01/15/2015

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:

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:

Upcoming Meetings

- **Modeling Workgroup Conference Calls (as needed)**
  - Date: February 5, 2015 and March 5, 2015.
  - Time: 10:00AM – 12:00PM
  - More information will be distributed closer to the meeting date.
  - February webevent
  - March webevent

- **January Modeling Quarterly Review**
  - Date: January 28-29
  - Time: 10:00AM – 3:00PM
  - Location: Joe Macknis Memorial Conference Room (Fishshack) CBPO 410 Severn Avenue Annapolis, MD
  - Conference Line: 1-866-299-3188 code 410-267-5731
  - Adobe Connect: https://epa.connectsolutions.com/modeling (enter as guest)
  - Event webpage