Toward Modeling and Analysis Tools For the 2017 Mid-Course Reevaluation

Water Quality Goal Implementation Team

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Key Points:

- The CBP models guiding TMDL planning and implementation are well founded and fully suited to their current task.
- Nevertheless, over the last quarter century, the CBP has been committed to refinement of our watershed, estuary, and airshed analysis tools.
- Refinement of the CBP modeling tools have always been oriented to providing the best available scientific tools for use by CBP decision makers.

Principles

- We continue to need a system of models from the watershed to estuary for the 2017 Mid-Point Assessment.

- Management decision making needs of the 2017 Mid-Point Assessment drive process.

- The Bay Program State and Federal agencies (WQGIT, Workgroups, Modeling Quarterly, University partners/ scientific community) implementing nutrient and sediment controls are our key customers.

- Meeting model delivery deadlines are a priority.

- CBP partners are committed to continuing to improve the accuracy, utility and reliability of the modeling effort.

- EO Commitments: Need to consider climate change capabilities of tools.

Chesapeake Bay Program Modeling

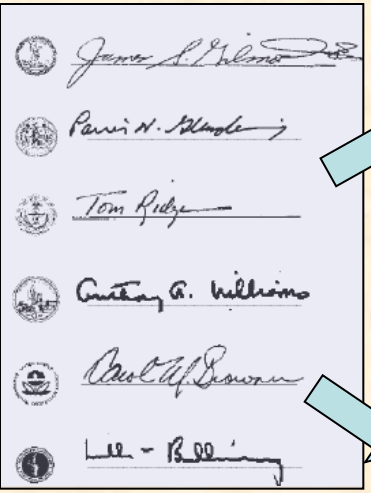
Land Use Change Model

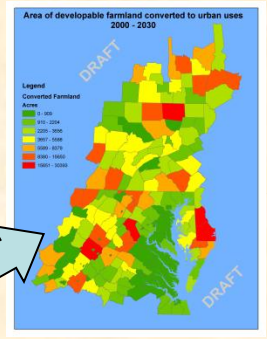
Management Actions

Watershed Model

Bay Model

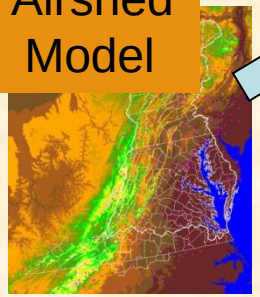
Criteria Assessment Procedures

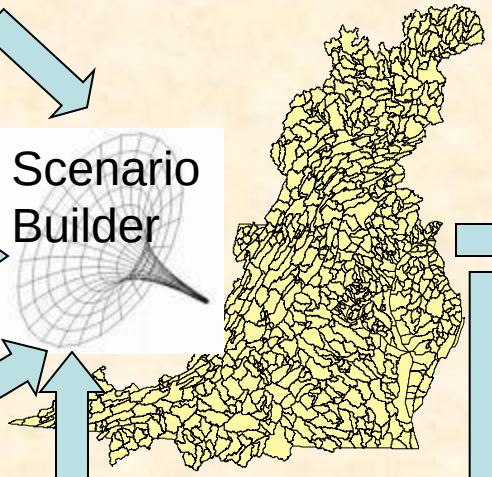


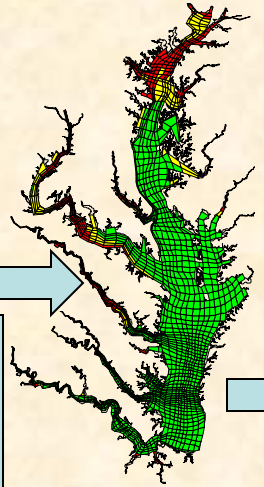


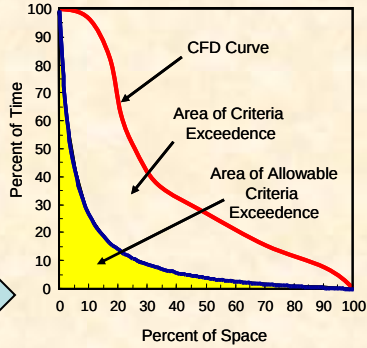
Scenario Builder

Airshed Model

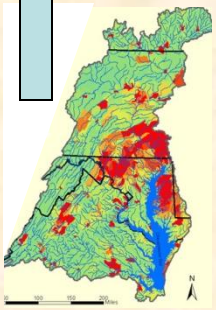








Sparrow



Effects

Allocations

Next Generation CBP Models for Mid-Point 2017 Assessment

- The outlines of a “rock-em-sock-em” action-packed five year plan.

- Assumes Phase III WIPs due 2017.

- Our long-term planning for the CBP models is focused on refining the watershed, airshed, and estuary and living resource models with the goal of a completely calibrated and operational suite of models at least one year in advance of the Phase III WIPs.

Next Generation Models for Mid-Point 2017 Assessment

The overall timeline might look something like this:

December 2010 - Phase I WIPs published with Phase 5.3 WSM and existing Bay Model.

December 2011 – Draft Phase II WIPs due to EPA with Phase 5.3.2 WSM and recalibrated Bay Model. March 30, 2012 – Final Phase II WIPs due to EPA.

January 2012 - Begin post TMDL 2-year milestone tracking with Phase 5.3.2 WSM and Bay Model.

December 2013 - Airshed Model updates planned and tracked for bi-modal NH_3 & Hg and new CMAQ scenarios.

2015-2016 - Fully calibrated and operational Watershed Model and next generation Bay Model ready for analysis of Phase III WIPs.

January 2016 – Jurisdictions develop Phase III WIPs with respect to what remains to be done in the final 7 years of planning (2018 -2025) to fully achieve the Bay water quality standards.

January 2017 – Jurisdictions submit Phase III WIPs with 2018 - 2025 actions and controls for review and approval.

Partnership Input Processes

- Normal BMP process for updating existing efficiencies with new research
- Issues related to inputs, land uses, BMPs, etc, will be discussed in source workgroups, WTWG, and WQGIT
- Issues of model theory, structure, and calibration will be discussed in the Modeling Quarterly Reviews.

Partnership Input Processes

- Discussion of WSM enhancements in regular STAC meetings
- Possibility of STAC workshops and reviews on specific topics
- Normal communication outlets
  - 300+ presentations have been given on the Phase 5 WSM

Timeline

- New WSM enhancements will be incorporated beginning summer 2011 until the final calibration begins
- Enhancements will be subject to feasibility constraints. The earlier decisions occur, the higher probability they can be successfully incorporated.

What We've Heard Already

- Transparency
- Scalability
- User-Friendliness

What We've Heard Already

- Improve incorporation of additional data
  - Non-cost shared BMP implementation data
  - Continue to incorporate the most current available meteorological, water quality, land use, and atmospheric deposition data
- Consider adding additional land uses
- Nutrient application and handling policies
- Investigate riverine processes
- Refinements to calibration approach

By Summer 2011 We Need to Begin to Lay Out Our Specifications for Next Generation Chesapeake Bay Water Quality and Sediment Transport Model (WQSTM)

General specifications for the next generation Chesapeake Bay estuary regulatory model are a state of the science, mass balance, regulatory model with key DO, chlorophyll - primary productivity, and SAV-clarity simulations as good or better than the current simulation. Goal: deliver fully operational model with complete operational links to the airshed and watershed models at least one year before the Phase III WIPs.

Potential Elements for Consideration – WQSTM:

- 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.

- Full sediment diagenesis with scour, resuspension, fate and transport of organic material.

- 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.

Potential Elements for Consideration - WQSTM

- Refined chlorophyll simulation and assessment particularly in the James and DC waters.

- Consider including a simulation of estuarine wetlands.

- Consider keeping CH3D-ICM investment in menhaden, oyster, SAV, sediment transport while improving shallow water embayment issues of scale + understanding of shallow water dynamics.

Q's and A's:

- The Schedule – When will these updates happen?
  - Some aspects of the refinements can begin immediately, such as input data development for expanding model years in order to bring in more and better calibration data.
  - Other refinements will take more of a commitment and will need to be prioritized.
  - We expect ongoing model refinements beginning summer 2011.

Q's and A's:

- How can CBP partners suggest ideas?
  - Initially, aspects of model refinements will be developed through the technical work groups with guidance from key management workgroups like the WQGIT.
  - The Modeling Workgroup, Ag Workgroup, Urban Stormwater Workgroup, Wastewater Workgroup, Sediment Workgroup, Watershed Technical Workgroup, Modeling Quarterly Reviews, and STAC are all sources of initial ideas for next generation CBP model development.

Q's and A's:

- Where can CBP partners go to see ideas on table?
  - A primary source of next generation CBP model ideas are the minutes from the technical workgroups and STAC. As these initial ideas developed they will be brought to the WQGIT for review and approval.
  - White papers that are under development will summarize ideas proposed to date.

Q's and A's:

- How will CBP prioritize updates and proposed refinements?
  - The WQGIT will review the model refinements suggested by the technical work groups and STAC.
  - The WQGIT and the Management Board will then forward recommended updates and refinements of the CBP TMDL models for EPA's consideration.