Modeling Workgroup Quarterly Review

April 4, 2023

Event webpage: Link
For In-Person Attendance: Oyster/Blue Crab Room at Chesapeake Bay Program Office
1750 Forest Drive, Suite 130, Annapolis, MD 21401
For Remote Access - WebEx Link:
https://umces.webex.com/umces/j.php?MTID=m9f8ed38d3432dab62611b8c776023c9e
Meeting number: 2623 428 1015 **Password:** QiCDD8Bap33
Phone number: +1-408-418-9388 **Access code**: 2623 428 1015
To enter the webinar, please open the webinar link first.
This meeting will be recorded for internal use only to assure the accuracy of meeting notes.

10:00 Announcements and Amendments to the Agenda – Mark Bennett, USGS and Dave Montali, Tetra Tech

10:10 Phase 7 Watershed Model (WSM) Overview – Gary Shenk, USGS-CBPO
Gary will provide a general overall summary of progress.

10:30 Discussion of the Phase 7 Model Overview

10:45 CalCAST Updates – Isabella Bertani, UMCES
Isabella will illustrate results of testing how different meteorological datasets and different potential evapotranspiration formulations impact CalCAST model performance. She will also provide an update on an effort to downscale water withdrawals to the NHD catchment scale. CalCAST is a relatively parsimonious Bayesian modeling tool that is being developed to test predictors and spatially calibrate parameters that will ultimately inform prediction of flow and loads at monitoring stations throughout the watershed.

11:05 Discussion of CalCAST development

11:20 Development of Efficient Multi-Objective Optimization Procedures – Development of Efficient Multi-Objective Optimization Procedures – Gregorio Toscano, Kalyan Deb, Pouyan Nejadhashemi, and Hoda Razavi, MSU
Progress in developing efficient multi-objective (MO) optimization procedures, including generative MO optimization using the current hybrid optimization procedure and population-based evolutionary algorithms will be presented.

11:45 Optimization Discussion

12:00 LUNCH

12:50 Progress in Phase 7 WSM Development – Gopal Bhatt, Penn State
Gopal will survey progress and describe activities upcoming in the next Quarter.

1:10 Discussion of Phase 7 WSM Development Progress

1:20 The *COMPREHENSIVE EVALUATION OF SYSTEM RESPONSE (CESR)* of the Chesapeake Report and Its Recommendations for CBP Modeling – Denice Wardrop, CRC, and Kurt Stephenson, Virginia Tech

The upcoming release of the CESR Report will be described. Its objectives are to 1) identify gaps and uncertainties in system responses that impact efforts designed to attain water quality standards; 2) identify recent scientific developments that can shed light on the gaps and uncertainties in system responses; 3) recommend research strategies that improve understanding of system responses; and 4) recommend strategies for integrating scientific and technical analysis with active adaptive management in order to aid decision-making under uncertainty.

1:40 Discussion of *COMPREHENSIVE EVALUATION OF SYSTEM RESPONSE (CESR)* and Its Recommendations for CBP Modeling

2:00 Progress of the Agricultural Modeling Team – Tom Butler, EPA-CBPO

Tom will describe the progress of the Ag Modeling Team in its role in determining the agricultural data inputs for the Phase 7 Watershed Model. He will provide background for how this group will function in collaboration with the Modeling Workgroup.

2:15 Discussion of Agricultural Modeling Team

2:30 ADJOURN

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April 5, 2023

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For Remote Access - WebEx Link:
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9:00 Announcements and Amendments to the Agenda – Dave Montali, Tetra Tech, and Mark Bennett, USGS

9:10 Forecasting the Relative Roles of Climate Change and Habitat Management on Chesapeake SAV – Marc Hensel and Christopher Patrick, VIMS
To predict how climate change and human activities will affect future SAV habitat, 40 years of aerial survey, ground observation and water quality data are used in a structural equation modelling approach to describe how different seasonal variables have controlled annual cover in each SAV community across the Bay to date. Then the projected effects of climate change (i.e., temperature rise, precipitation, and nutrient and sediment loads) and human activities (i.e., nutrient input management) are used to estimate climate change influence on Chesapeake's SAV communities.

9:40 Discussion of Forecasting the Relative Roles of Climate Change and Habitat Management on Chesapeake SAV

10:00 Update on Main Bay Model (MBM) Progress – Joseph Zhang, VIMS
Joseph will present first results with the almost completed MBM code and discuss some key questions and plans for 1) mesh expansion to cover eastern shore and refinement in some key tributaries; 2) the SAV simulation approach in the MBM and related revision of the MBM mesh; and 3) recalibration workflow for the two-step ('offline') mode. Recalibrated hydrodynamic results on the revised new mesh will also be presented.

10:35 Discussion of the Main Bay Model (MBM) Progress

10:50 Refinement of the Temperature Dependence of Algal Growth Rates in the MBM and MTMs – Clifton Bell, Brown and Caldwell
Cliffton will describe motivations for refining the algal growth response to temperature in the MBMs and MTMs. Possible approaches to achieve this is through 1) examination of the shallow water monitoring continuous temperature and chlorophyll measurements; 2)

updating the literature search; and 3) convening a STAC workshop/session in the first or second quarter of 2024.

11:10 Discussion of the Refinement of the Temperature Dependence of Algal Growth Rates in the MBM and MTMs

11:20 Progress on MTMs in the Potomac and Choptank Rivers – Nicole Cai, EPA ORISE, and Richard Tian, UMCES-CBPO
Richard and Nicole will discuss initial progress on the set up of the Choptank, Potomac, and other MTMs.

11:40 Discussion of the Potomac, Choptank, and Other MTMs Set Up Progress

11:50 LUNCH

12:50 Integrated Watershed-Wide Indicator of the TMDL-Required Reduction of Nitrogen and Phosphorus – Gary Shenk, USGS-CBPO, and Qian Zhang, UMCES
An Integrated Watershed-Wide Indicator of the TMDL-Required Reduction of N and P will be presented. The indicator separates the TN and TP loads into elements of 1) implemented and realized load reductions; 2) implemented load reductions but lagged; 3) future implementation of load reductions; and 4) other categories**.** The indicator will provide CBP with greater insight into the guidance given from monitoring and modeling estimates of loads.

1:20 Discussion of the Integrated Watershed-Wide Indicator of the TMDL-Required Reduction of Nitrogen and Phosphorus

1:30 ADJOURN