Modeling Workgroup April Quarterly Review

Day 1 – April 1, 2025

Event webpage: Link
For Remote Access – Microsoft Teams Link: Join the meeting now
Meeting number: 246 538 590 671 **Password:** NydC9A
Dial in by phone: +1 469-208-1525,,870731205# **Phone conference ID**: 870 731 205#
Find a local dial-in number
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.

9:00 Announcements and Amendments to the Agenda – Mark Bennett, USGS and Dave Montali, Tetra Tech

9:05 Conowingo Model Development – Earl Hayter, Jodi Ryder, CoE-ERDC and Matt Rowe, MDE
Progress in development of the Conowingo Model will be presented.

9:20 Discussion of the Conowingo Model Development and Application

9:30 Phase 7 Watershed Model Overview – Gary Shenk, USGS-CBPO
Gary will provide an updated timeline for completion of the Phase 7 Model in time for the 2026 partnership review.

9:45 Discussion of the Phase 7 Model Overview

9:55 Update on CalCAST Development – Isabella Bertani, UMCES-CBPO
Isabella will describe the status of CalCAST model development and discuss issues and next steps towards getting to finalized models by the end of the year

10:15 Discussion of CalCAST Development

10:25 Progress in Phase 7 WSM Development – Gopal Bhatt, Penn State-CBPO and Rob Burgholzer, DEQ
A key theme of the last quarter has been continued development and refinement of the Dynamic Watershed Model (DWSM) and Main Bay Model (MBM) linkage. An operational draft of linkage and initial results based on NetCDF transfer of calibration (and scenarios in future) files will be discussed. Potential refinements to DWSM hydrology by exploring other precipitation dataset will be reviewed. In addition, progress on the work to provide atmospheric deposition loads to the WSM and MBM domains along with general progress in the DWSM will be presented.

11:05 Discussion of Phase 7 WSM Development Progress

11:15 Development of Efficient Multi-Objective Optimization Procedures – Kalyan Deb, Pouyan Nejadhashemi, and Hoda Razavi, MSU

Progress on the integration of web-user and decision-making interfaces, and tasks for multi-state implementation using machine learning and parallel computing platforms will be presented. The upcoming webinar on application of the optimization tool will be discussed.

11:30 Optimization Discussion

11:40 Phase 7 Land Use Data Workplan and Progress – Sarah McDonald, USGS-CBPO

Sarah will go over the Phase 1 plan, which includes a backcast of land use to 1985, and Phase 2 plans, which include additional corrections and options for new data to be added. Staff losses may lead to a truncated Phase 2 product.

12:00 Discussion of Phase 7 Land Use Data Progress

12:10 LUNCH

1:10 Future Climate Impacts of CBP BMP Efficiencies – Michelle Miro and Krista Grocholski, RAND

Progress will be presented on application of APEX and SWMM, both public domain watershed and stormwater models, under different future climate hydrologic conditions to determine relative pollutant removal efficiency change of current CBP-approved NPS and stormwater management BMPs.

1:20 Discussion of Stormwater Management in a Changing Climate SWM & AG BMPs

1:30 The Drainage Dilemma: Hydrological Pathways and Nutrient Fluxes in Tile-Drainage and Open-Ditch Systems in Small Agricultural Catchments – Gurpal Toor, UMD

How distinctive cropland practices on the Coastal Plains under tile-drainage and open-ditch lead to differential nutrient export will be presented.

1:50 Discussion of Nutrient and sediment Loads from Tile Drainage and Open Ditch Cropland

2:00 Phase 7 Land-to-Water Connectivity – Michelle Katoski, USGS- Lower Mississippi Gulf Water Science Center

Progress in the work to produce land-to-water metrics at the NHD Catchment scale for testing in CalCAST will be presented. The work's objective is to improve the simulated fate and transport of nutrient and sediment on the land to the Phase 7 DWSM stream and river network.

2:20 Discussion of Land-to-Water Connectivity Work

2:30 Water Quality Modeling using Machine Learning Techniques – Chaopeng Shen, PSU

A cooperative Agreement for Penn State PIs to support and collaborate with CBP scientists and modelers using machine learning and/or other appropriate techniques will be described. The work will be applied to the high-resolution land use, landforms, hydrography data, and additional data relevant to watershed hydrology and nutrient and sediment processes to inform and improve the development of the CBP's Phase 7 Models. The evolution of the artificial intelligence/machine learning field in the context of watershed and estuarine sciences will be presented.

2:50 ML Discussion

3:00 ADJOURN

Modeling Workgroup April Quarterly Review

Day 2 – April 2, 2025

Event webpage: Link
For Remote Access – Microsoft Teams Link: Join the meeting now
Meeting number: 246 538 590 671 **Password:** NydC9A
Dial in by phone: +1 469-208-1525,,870731205# **Phone conference ID**: 870 731 205#
Find a local dial-in number
This meeting will be recorded for internal use only to assure the accuracy of meeting notes.
==========

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

10:05 Beyond Point Measurements: Modeling Benthic Forage Response to Hypoxia - Ryan Woodland and Jeremy Testa, UMCES
A novel modeling approach for understanding the spatial structure of hypoxia in Chesapeake Bay and how tradeoffs between primary production and hypoxia are correlated with taxonomic groups of benthic invertebrates that are key forage for finfish will be presented. The project could prove to be a useful approach to habitat modeling in the Chesapeake under climate change and eutrophication management.
Video overview of project (link).

10:35 Discussion of Modeling Benthic Forage Response to Hypoxia

10:45 Update on Main Bay Model (MBM) Progress – Zhengui Wang, Joseph Zhang, and Jian Shen, VIMS
Progress on the linkage of the Dynamic Watershed Model (DWSM) and the MBM will be presented with insights on how the Phase 7 DWSM inputs are improving load estimates to the smaller tidal embayments of the Chesapeake. In addition, a new calibration of the MBM to Phase 6 loads at the River Input Monitoring (RIM) stations and Phase 7 loads from the Coastal Plain will be presented. The MBM work is being readied for initial climate and management sensitivity scenario testing.

11:20 Discussion of the Main Bay Model (MBM) Progress

11:30 Comparison of Phase 6 and Phase 7 Shoreline Erosion Loads – Richard Tian, UMCES-CBPO
The tidal shoreline erosion loads using the new Phase 7 shoreline erosion power equation approach will be compared to the previous Phase 6 shoreline erosion approach. The TSS, TN, and TP loads from the Phase 6 watershed DWM will also be compared to the Phase 6 and Phase 7 shoreline erosion loads as a point of comparison.

11:50 Discussion of Phase 6 and Phase 7 Shoreline Erosion Loads

12:00 Updating and Expanding CB Nutrient Limitation Analysis – Tom Fisher, UMCES
New bioassay results of nutrient limitation in the Chesapeake mainstem and tributaries will be presented. The simulation of nutrient limitation is an important calibration point for the MBM and MTMs.

12:30 Discussion of Nutrient Limitation Studies

12:40 LUNCH

1:30 Review of STAC Climate Change 3.0 Workshop Document – Gary Shenk, USGS-CBPO
Key findings of the STAC Climate Change 3.0 Workshop report will be discussed.

1:45 Discussion of STAC Climate Change 3.0 Workshop Document

1:55 Progress on Patapsco/Back MTM – Harry Wang, Breanna Maldonado, VIMS and Jeremy Testa, UMCES
Progress on the Patapsco/Back MTM will be reviewed and plans to move forward with water quality calibration using the latest version the Phase 7 Watershed Model will be discussed.

2:15 Discussion of Patapsco/Back MTM Progress & P7 linkage.

2:25 Progress on the Rappahannock MTM & P7 Linkage – Qubin Qin, East Carolina University and Jian Shen, Zhengui Wang, Pierre St-Laurent, VIMS
Progress on the Rappahannock MTM will be reviewed by the Rappahannock MTM Team. The application of using merged high-resolution Rappahannock River and the main Bay models will be presented. Preliminary water quality model calibration using Phase 6 loading will be discussed.

2:45 Discussion of Rappahannock MTM Progress

2:55 Progress on the Choptank MTM – Jian Zhao, William Nardin, Elizabeth North, Larry Sanford, Jeremy Testa, UMCES and Jiabi Du, Texas A&M
Progress on the Choptank MTM and P7 linkage will be described by the Choptank MTM Team and plans to move toward water quality calibration with the latest version the Phase 7 Watershed Model will be discussed.

3:15 Discussion of Choptank MTM Progress

3:25 ADJOURN