Modeling Workgroup Quarterly Review

January 10, 2023

Event webpage: Link
For Remote Access - WebEx Link:
https://umces.webex.com/umces/j.php?MTID=m540fb236eebe412df9a7b43dcadfee1f
Meeting number: 2622 392 6705 **Password:** PWiPHruh927
Phone number: +1-408-418-9388 **Access code**: 2622 392 6705
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

10:05 Phase 7 Watershed Model Overview – Gary Shenk, USGS-CBPO
Gary will provide an overall summary of progress over the last quarter.

10:20 Discussion of the Phase 7 Model Overview

10:30 Update on CalCAST Development: Annual flow and loads – Isabella Bertani, UMCES
Isabella will provide an update on the progress made in the development of CalCAST, specifically focusing on adding the capability to predict flow and loads at an annual time step. 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.

10:50 Discussion of CalCAST development

11:00 Progress in Phase 7 WSM Development – Gopal Bhatt, Penn State
The NHDplus scale Phase 7 Dynamic Watershed Model (DWM) was expanded to include simulation of nutrients, water temperature, DO, and phytoplankton. DWM is using a nested model segmentation of streams and rivers with a hybrid structure for the simulation of water quality processes using HSPF and Simple Routing models. Gopal will provide an overview of the progress made during this quarter on the aspects of (a) incorporation of CalCAST nitrogen and phosphorus in an operational DWM framework, (b) verification of flow, sediment, nitrogen, and phosphorus simulations, and (c) considerations for the computational requirements, and (d) the next steps.

11:30 Discussion of Phase 7 WSM Development Progress

11:40 Development of Efficient Multi-Objective Optimization Procedures – Gregorio Toscano, Kalyan Deb, Pouyan Nejadhashemi, Rafiei Vahid, and Hoda Razavi, MSU
Progress in the development of efficient multi-objective (MO) optimization procedures for all the CBPO BMPs and land uses will be discussed.

12:00 Optimization Discussion

12:10 LUNCH

1:10 A Path forward on CAST Assessment of 2025 WIP Outcomes – Gary Shenk, CBPO
A proposal from Maryland to resolve and assign work on portions of the three PSC decisions related to CAST from the August 29, 2022 PSC meeting will be discussed.

1:30 Discussion of A Path forward on CAST

1:40 ADJOURN

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

10:05 Update on Main Bay Model (MBM) Progress – Jian Shen, VIMS Update
Progress with the MBM over the last quarter will be described. In the quarters of 2022 and into 2023 the MBM is focused on developing the workflow to generate all inputs including atmospheric deposition and shoreline erosion, improving the SAV simulation, using initial Phase 7 WSM inputs of hydrology and loads, refining the mesh for the simulation of shallow water dynamics, and refining living resource linkages. We also conducted the first simulations using the 'two-step' approach.

10:40 Discussion of the Main Bay Model (MBM) Progress

10:50 Multiple Tributary Model (MTM) RFA – Lew Linker, EPA-CBPO Update
An update on the MTM RFA will be provided.

11:00 Discussion of Approaches to MTM Selection

11:05 Progress on Phase 7 Watershed and Tidal Water Model Boundaries – Andy Fitch, USGS-CBPO
Andy will describe the final product of updated and refined model boundaries for the Phase 7 Watershed Model, MBM, and MTMs including spatially detailed estimates of the tidal wetlands.

11:20 Discussion of Phase 7 Watershed and Tidal Water Model Boundaries

11:30 Tidal Marsh Migration In Response to Sea Level Rise – Molly Mitchell, Karinna Nunez, Christine Tombleson, and Julie Herman, Center for Coastal Resources Management VIMS

The report *Synthesis of Shoreline, Sea Level Rise, and Marsh Migration Data for Wetland Restoration Targeting* will be presented.

11:40 Discussion of Tidal Marsh Migration In Response to Sea Level Rise

11:50 LUNCH

12:30 Test Beds for Dynamic Tidal Shoreline Nutrient and Sediment Loads – Larry Sanford, UMCES; Richard Tian, UMCES; Nicole Cai, ORISE and Carl Cerco, Attain

Estimated shoreline erosion loads are a constant average input in the Phase 6 assessment. However, dynamic inputs of shoreline TSS, TN, and TP may be important in the finer scales of Phase 7. To assess the importance of dynamic shoreline loads in the MBM and MTMs, two test beds of the Corsica and Choptank simulations will be used. Dynamic inputs of shoreline loads require input estimates of 1) wave power (function of wave speed, wave energy, and depth), 2) shoreline height, 3) protected shoreline, 4) bulk density, 5) sand, silt, & clay classes, 6) eroded shoreline, and 7) TN & TP species.

12:50 Discussion of Dynamic Tidal Shoreline Simulation Test Bed Approach

1:00 Climate Change and Striped Bass Chesapeake Habitat – Tom Parham, Andrew Keppel, Jim Uphoff, and Renee Karrh, MD-DNR

Progress in an analysis to assess DO and water temperature related striped bass summer habitat conditions, Bay-wide, by State, and by CB Segment, under 2025 and 2055 climate conditions will be discussed. Key Bay restoration/climate scenarios of Full WIP3 Implementation and No Action scenarios will be used to estimate change in the quantity/quality of habitat rated as Suitable, Tolerable, Marginal, or Unsuitable.

1:20 Discussion of Climate Change and Striped Bass Chesapeake Habitat

1:30 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.

1:50 Discussion of Forecasting the Relative Roles of Climate Change and Habitat Management On SAV

2:00 Review of the 2020, 2021, and 2022 Summer Hypoxia Forecasts and Proposed Refinements – Isabella Bertani, UMCES

Isabella will review the previous three years of Summer Hypoxia Forecasts since she and a team of VIMS, UMCES, DNR, and University of Michigan PI had refined the methodology. Further refinements to the method for the 2023 forecast will be discussed.

2:20 Discussion of Summer Hypoxia Forecast Refinements

2:30 ADJOURN