Modeling Workgroup Quarterly Review

October 5, 2021

Event webpage:
https://www.chesapeakebay.net/what/event/october_2021_modeling_workgroup_meeting_quarterly_review

For Remote Access - WebEx Link:
https://umces.webex.com/umces/j.php?MTID=mb14d9d5173281e99a2b58a54acb391b1

Meeting number: 2623 866 1185 **Password:** WeuMnn8aP43

Phone number: +1-408-418-9388 **Access code**: 2623 866 1185

To enter the webinar, please open the webinar link first.

This meeting will be recorded for internal use 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 Options for Watershed Model Phase 7 Work Plan – Gary Shenk, USGS-CBPO

In a preview of a presentation Gary will make to the WQGIT later in October, the options of emphasis in the Phase 7 Work Plan will be reviewed including fine scale (NHD-scale) modeling, improvement in the physical process simulation, quantifying co-benefits, improved evaluation of Bay TMDL water quality standards, changing nutrient input calculations, improvement of the climate change simulation, and an uncertainty quantification.

10:00 Discussion of Phase 7 Options

10:30 Phase 7 WSM Development – Gopal Bhatt (Penn State)

Prior presentations on the Development of Phase 7 watershed model included overview of (a) an initial prototype of the CalCAST, a time-averaged spatially distributed hydrology model of medium resolution NHDplus, and (b) an initial, operational prototype of a time-varying, dynamic spatially distributed hydrology model with hourly simulation of NHDplus scale streamflow. Building on prior work, the presentation will provide an overview, analysis, and results of an initial prototype for linking the two models for moving towards a fuller integration of Phase 7 Dynamic Model with the Phase 7 CalCAST.

10:45 Discussion of Phase 7 WSM Development

11:00 Comparison of Modeled and Monitored Nutrient Trends and Other Watershed Analyses – Isabella Bertani, UMCES

The presentation will provide an update on analyses aimed at obtaining an appropriate comparison between the output of the Phase 6 Dynamic Watershed Model and flow normalized loads from WRTDS. In addition, discussion of work on testing watershed properties as predictors of long-term average streamflow will provide an overview of tests performed to assess the ability of different watershed properties to improve

calibration of CalCAST. CalCAST is the Phase 7 time-averaged model of streamflow at the NHDplus 1:100K scale.

11:30 Discussion of Modeled and Monitored Nutrient Trend Comparisons and Other Watershed Analyses

11:45 BREAK

12:45 Optimization Update: Integration with CAST – Gregorio Toscano, Kalyan Deb, Pouyan Nejadhashemi, Sebastian Hernandez-Suarez, and Julian Blank, MSU
The initial integration of the optimization framework with CAST will be presented. The approach uses CAST to validate the initial settings and evaluate the proposed solution. Progress on the web interface needed for the CBP user testing by the Optimization Guidance Group will be discussed.

1:15 Optimization Discussion

1:30 High-Resolution Land, Tidal Water, and Tidal Wetland Boundaries to Inform the Phase 7 Models – Andy Fitch, USGS
The high resolution Phase 7 Models require an attention to detail not previously needed in the lower spatial resolution Phase 6 Models. Andy will describe work to differentiate at high spatial resolution the Watershed Model and Tidal Bay Model domains. In addition, the 2017 land use/land cover data will be used to identify wetlands within or intersecting with the tidal shoreline boundary. The resulting tidal wetland areas will be a tabulated as part of the Watershed Model land cover, but will be simulated in the new tidal Bay model.

2:00 Discussion of High-resolution Landscape Characterization

2:15 Transport and Fate of Oxidized and Reduced Atmospheric Emissions – Jesse Bash and Sarah Benish, EPA-ORD
Progress on estimating the transport and fate of atmospheric emissions of oxidized nitrogen (NOx) and ammonium (NH_4^+) will be presented. The analysis centers on the question, “For a nitrogen emission source from different regions in the Chesapeake watershed, what is the fraction that is deposited to a particular region or point?”. In addition, the analysis can be used to estimate reductions in nitrogen deposition to the Chesapeake watershed and tidal Bay under future conditions of greater penetration of electric vehicles into the existing mobile fleet, greater wind and solar electric generation, and other types of future economic conditions.

2:40 Discussion of the Transport and Fate of Oxidized and Reduced Atmospheric Emissions

3:00 Dynamic Reservoir Operation Rules and Evaporation Simulation Impact on Model Goodness of Fit in Lake Anna – Rob Burgholzer and Joseph Kleiner, DEQ

The VAHydro operational rules model combines edge of stream inflows from the Phase 6 model with a temperature-based regression model of power plant evaporative cooling, and a detailed simulation of reservoir release rules required by the Virginia Water Protection Permit for the operation of the nuclear power plant in Lake Anna. This approach provides for improved goodness of fit in both downstream flows and lake surface elevation drawdown during drought conditions.

3:20 Discussion of Dynamic Reservoir Operation Rules

3:35 ADJOURN

Modeling Workgroup Quarterly Review

October 6, 2020

Event webpage:

https://www.chesapeakebay.net/what/event/october_2021_modeling_workgroup_meeting_quarterly_review_day_2

For Remote Access - WebEx Link:

https://umces.webex.com/umces/j.php?MTID=mb14d9d5173281e99a2b58a54acb391b1

Meeting number: 2623 866 1185 **Password:** WeuMnn8aP43

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

9:05 Overview of the Phase 7 Main Bay Model (MBM) and Multiple Tributary Models (MTMs) – Lew Linker, EPA-CBPO

Elements of a presentation to be made to the WQGIT on October 25-26 including an overview of the Main Bay Model (MBM) and the associated fine-scale Multiple Tributary Models (MTMs) of the tidal Bay and their utility to the CBP Partnership in the assessment of 2035 climate impacts will be reviewed. How the MBM and MTM teams will be organized and the preparation for the MBM and MTM work that is now underway will be presented.

9:35 Discussion of the MBM and MTM overview.

10:00 Initial Set-up of a MTM in the Tidal Patuxent River - Richard Tian, UMCES

Richard will provide insights into an initial trial setup of a MTM using the Patuxent River as an example. In addition, Richard will present his experience in using the unstructured grid models of FVCOM and SCHISM in the Corsica River simulation.

10:30 Discussion of the Patuxent River initial MTM setup

10:45 Initial Set-up of a MTM in the Tidal James River – Nicole Cai, VIMS

Nicole will describe work in an initial trial set up of a MTM in the tidal James River drawing from her experience in simulating the York with an unstructured grid model.

11:15 Discussion of the James River initial MTM setup.

11:30 Corsica River Shallow Water Simulation – Jeremy Testa, UMCES
Findings of a study of shallow water processes in the simulation in the Corsica River with SCHISM will be discussed.

12:00 Discussion of Corsica River Shallow Water Processes

12:15 STAC Climate Change 2.0 Workshop Report – Gary Shenk, USGS
Gary Shenk will give an overview of the STAC Climate Change 2.0 Workshop Report and the recommendations that resulted.

12:45 Discussion of STAC Climate Change 2.0 Workshop Report

1:00 ADJOURN