Modeling Workgroup Quarterly Review

July 6, 2021

Event webpage:

https://www.chesapeakebay.net/what/event/july_2021_modeling_workgroup_quarterly_review_meeting_day_1

For Remote Access - WebEx Link:
https://umces.webex.com/umces/j.php?MTID=mf136d8221a185f8ebc7a62a1802f8937

Meeting number: 120 471 9812 **Password:** u2bh7M8x

Phone number: +1-408-418-9388 **Access code**: 120 471 9812

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 Overall Review of Phase 7 WSM – Gary Shenk, USGS

The tasks, sequence, timing, and critical paths for the various tasks of Phase 7 CAST, CalCAST, and Dynamic Model for a fully operational model by December 2023 will be presented.

9:30 Discussion of Phase 7

9:45 Phase 7 WSM Development – Gopal Bhatt (Penn State)

In April, a presentation was made that provided an overview of an initial prototype of the CalCAST, a time-averaged spatially distributed hydrology model of medium resolution NHDplus scale. Over the last quarter the primary focus for the watershed model development has been on a time-varying, dynamic spatially distributed hydrology model with hourly simulation of NHDplus scale streamflow. The presentation will provide an overview, structural details, initial results, and validation of the dynamic hydrology model prototype.

10:15 Discussion of Phase 7 WSM Development

11:00 Comparison of Modeled and Monitored Nutrient Trends and Other Watershed Analyses – Isabella Bertani, UMCES and Gary Shenk, USGS-CBPO

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.

11:40 Quantifying Co-Benefits of Ecosystem Services Associated with BMPs –Ryann Rossi, ORISE-EPA ORD

This project is focused on quantifying ecosystem services associated with BMPs relevant to upstream communities. Results will be used to communicate co-benefits associated with BMPs via CAST and other materials.

12:00 Discussion of Quantifying Co-Benefits of Ecosystem Services

12:10 BREAK

1:00 Optimization Update: Integration with CAST – Kalyan Deb, Pouyan Nejadhashemi, Gregorio Toscano, Sebastian Hernandez-Suarez, and Julian Blank

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. The initial results show that the proposed methods can reduce the BMP implementation cost while satisfying the load threshold.

1:20 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 CMAQ Tracer Runs – Jesse Bash and Sarah Benish, EPA-ORD

Work on estimates of 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.

3:00 Discussion of CMAQ Tracer Runs

3:15 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.

3:35 Discussion of Dynamic Reservoir Operation Rules

3:45 ADJOURN

Modeling Workgroup Quarterly Review

July 7, 2020

Event webpage:

https://www.chesapeakebay.net/what/event/july_2021_modeling_workgroup_quarterly_review_meeting_day_2

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

Meeting number: 1206223670 **Password:** u2bh7M8x

Phone number: +1-408-418-9388 **Access code**: 1206223670

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 SAV Nutrient Cycling – Nicole Cia, VIMS

Nicole will describe work in the San Francisco and Chesapeake Bays examining SAV nutrient cycling with an unstructured grid model.

9:35 Discussion of SAV Nutrient Cycling

9:45 SAV Nutrient Dynamics and DO Impacts – Carl Cerco, Attain and Richard Tian, UMCES

The 2017 WQSTM estimated SAV nutrient flux by submerged aquatic vegetation will be presented. Examination of seasonal net nutrient flux is anticipated to simulate net import of nutrients to SAV in the growing season, augmented by simulated enhanced settling of particles in SAV beds. After the SAV growing season a nutrient flux out of the SAV beds, mostly as organics, is anticipated.

10:15 Discussion of SAV Nutrient Dynamics and DO Impacts

10:30 Analysis of Chesapeake Bay Marine Discharges – Richard Tian, UMCES and Carl Cerco, Attain, Inc.

An analysis of the movement of marine discharges in the lower Bay using modeled tracers will be described. The analysis provides insight into the fate, transport, and residence times of marine discharges based on nonreactive dissolved and particulate tracers in the 2017 Bay Model.

11:15 Discussion of Chesapeake Bay Marine Discharge Analysis

11:30 BREAK

11:40 The Importance of Scale in the Simulation of Chesapeake – Pierre St-Laurent and Marjy Friedrichs, VIMS

A tidal Bay model with a 1.8 km grid versus 600 m grid are compared with the findings that the finer scale grid provided more realistic coastlines, little to no bathymetric smoothing required, and a more realistic geometry for the deep channel hypoxia and of the tributaries.

12:10 Discussion of The Importance of Scale

12:20 Tributary Summary Update – Jeni Keisman, USGS

Progress with the Tributary Summaries and where they can be found on the CBP website will be described.

12:30 Discussion of Tributary Summaries

12:35 A Tidal Water Model for the Assessment of 2035 Climate Change Risk to the Chesapeake TMDL – Lew Linker, EPA-CBPO

Progress on the Chesapeake Bay Program Request for Assistance (RFA) for next generation state-of-the-science model of the Chesapeake using an unstructured grid will be discussed. The new tidal Bay model, to be fully operational in 2025, is needed for the assessment of water quality standards under 2035 climate change conditions. The approach will be consistent with the STAC Next Generation Model Workshop Report using multiple tributary model teams, all using the same model structure and code, in conjunction with an overall integrating model of the main stem Bay and all tributaries.

12:50 Discussion of a New Tidal Water Model for the Assessment of 2035 Climate Change Risk.

1:00 ADJOURN