



Modeling Workgroup Quarterly Review

January 6, 2021 (Day 1)

Event webpage:

https://www.chesapeakebay.net/what/event/january_2021_modeling_workgroup_meeting_quarterly_review

For Remote Access:

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Meeting number:

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Phone number: +1-408-418-9388 United States Toll

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

10:05 Fine-Scale Chesapeake Regional Hydrology Model (CRHM) Development – Gary Shenk (USGS-CBPO), Gopal Bhatt (Penn State)

The presentation will provide progress updates and 2021 plans on the development of a fine-scale distributed hydrology and water quality model of the Chesapeake Bay watershed at NHDplus catchment scale.

10:40 Comparison of Modeled and Monitored Nutrient Trends – Isabella Bertani, UMCES and Gary Shenk, USGS-CBPO

Maturation of the CBP's non-tidal monitoring network and the inclusion of lag time components in the CBP's Phase 6 Dynamic Watershed Model have created the opportunity to better compare modeled and monitored trends. The presentation will focus on obtaining an appropriate comparison between the output of the Phase 6 Dynamic Watershed Model and flow normalized loads from WRTDS. Future work will involve statistical methods for a comparison of trends.

11:10 Optimization Update: Development of A Memetic Algorithm for Large-Scale Watershed Optimization – Gregorio Toscano, Kalyan Deb, and Pouyan Nejadhashemi, MSU

In order to find a true global optimum and avoid local optimums as final solutions the presentation will introduce a memetic algorithm for large-scale non-convex optimization problems such as with the CAST optimization of "minimize cost\maximize nutrient reduction (and cobenefits)". The proposed approach successfully combines a genetic algorithm for coarse search and an interior-point-based method for local search.

11:50 High-resolution Landscape Characterization to inform the Next Generation of Hydrologic Models – Peter Claggett, USGS

A key aspect of support for the CRHM is provided by a one-meter-resolution land-cover and land-use datasets and complementary 1-meter resolution hydrography data now being developed. The land-cover datasets will be translated into three, 58-class, land-use datasets using a variety of local (e.g., tax parcels) and regional (e.g., soils and roads) ancillary datasets. To complement these data, the development of hydrography data consisting of 1-meter resolution (1:2400-scale) fluvial features such as channels, gullies, and ditches are also being developed. Channels will be attributed with estimates of flow permanence and channel dimensions (width, depth, and bank angle) and the mapping of floodplains and other hydrologically active areas on the landscape will be refined.

12:30 BREAK

12:45 Climate Change and BMP Performance – Zack Easton, VA tech

Zack will provide an update on the STAC Technical Synthesis *A systematic review of Chesapeake Bay climate change impacts and uncertainty: watershed processes, pollutant delivery, and BMP performance.*

1:15 Introducing FieldDoc – John Dawes, Chesapeake Commons

Field doc is an online application that allows users to document BMP implementation while in the field using spatial data to assist with fine-scale targeting and integration with state BMP databases. Critical elements include management practices that were utilized, where the practices are located, and their current condition. FieldDoc seeks to address the data management challenges by providing a reporting framework that cleanly integrates with investment programs targeted at restoration and land protection projects.

1:30 CB County Fact Sheets – Robert Sabo, EPA and Breck Sullivan, CRC

Robert and Breck will provide an update on the status of the county level fact sheets and efforts to develop bay-wide nutrient inventories across the Chesapeake Bay and efforts to relate shifts in the inventory to observed changes in water quality. Overview of major trends for likely sources of point and non-point source pollution will be presented at the county level as well as preliminary statistical results on state level effects on these trends. This inventory and associated County Fact Sheets demonstrate the power of maps and pictures in communicating largely positive progress in the Chesapeake watershed and Bay clean up and satisfy stakeholder and decision makers' desire to see where they stand, by county in this case, relative to other counties and regions.

2:00 Development of NHDplus Inputs for the Fine-Scale Chesapeake Regional Hydrology Model (CRHM) – Isabella Bertani, UMCES

Inputs needed for the CRHM at the NHDplus scale of more than 80,000 model cells will be a big job in 2020. Isabella will describe the initial development of input data and provide a look forward at the overall task at hand.

2:15 Analysis of Cobenefits of CBP BMPs – James (Bo) Williams, EPA-CBPO

Bo will report out on the progress being made in in several projects on estimating co benefits of BMPs and other CBP management actions including the quantification of the hazard mitigation benefits of nutrient and sediment BMPs.

2:30 Adjourn



Modeling Workgroup Quarterly Review **January 7, 2021 (Day 2)**

Event webpage:

https://www.chesapeakebay.net/what/event/january_2021_modeling_workgroup_meeting_quarterly_review_day_2

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Access code: 120 672 0171

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

10:05 Open Bay Vertical Water Quality Assessments in High Temporal Resolution – Peter Tango, USGS

An update will be provided on tradeoffs on 2-3 or more sensor arrays, telemetry or download sensors, number of sensors on string and overall cost.

10:30 STAC Climate Change Technical Synthesis Shallow Tidal Water DO Dynamics – Jeremy Testa, UMCES

A comprehensive synthesis that includes a statistical analysis of the shallow water data in concert with numerical model simulations and linkages to local physical conditions and watershed features will explore the DO dynamics of shallow tidal waters. The synthesis will generate an improved understanding of how local eutrophication and the effects of future climate will impact oxygen criteria and dynamics in shallow waters, provide estimates of uncertainty for how sensitive oxygen will be to future climatic change, and lead to improved numerical tools to CBP assessment of future shallow habitat change in response to the Chesapeake restoration.

11:15 James Chlorophyll Model Findings – Tish Robertson, DEQ and Jian Shen, VIMS

Tish and Jian will review a series of scenarios developed with various point source discharge loads from different point source locations in the tidal James helped to provide a decision framework that allowed for the possibility of an outcome that was both environmentally protective and cost efficient overall. The findings of the work that the Modeling Workgroup has contributed will be presented.

12:00 BREAK

12:30 SAV Nutrient Dynamics and DO Impacts – Carl Cerco, Attain and Richard Tian, UMCES

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

1:20 Analysis of Tidal Bay Nutrient Limitation based on the 2017 Bay Model – Qian Zhang and Richard Tian, UMCES

The importance of nutrient limitation to Bay Model calibration as applied to broad CBP policy such as the Watershed Implementation Plans (WIPs) will be discussed. A comparison between model estimates and bioassay observations and an examination of estimated nutrient limitation of key scenarios (e.g., No Action, WIP3, E3) will be described.

1:50 Potomac Tributary Report – Jeni Keisman, USGS

Jeni will present the *Potomac Tributary Report: A summary of trends in tidal water quality and associated factors, 1985-2018* which is the first in a series of important assessments on Chesapeake's tidal tributaries.

2:10 A Tidal Water Model for the Assessment of 2035 Climate Change Risk to the Chesapeake TMDL – Lew Linker, EPA-CBPO

The Chesapeake Bay Program requires a next generation model of the Chesapeake Bay tidal waters that is a state-of-the-science model of the Chesapeake using an unstructured grid. 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. An approach 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 will be discussed.

3:00 ADJOURN