Climate Resiliency Workgroup (CRWG) Meeting

Monday, February 25, 2019
10:00 AM –3:00 PM Full Workgroup

Conference Line: 202-991-0477 Code: 9037008
Adobe Connect (enter as a guest): https://epawebconferencing.acms.com/crwg/
Meeting Materials:
https://www.chesapeakebay.net/what/event/climate_resiliency_workgroup_january_meeting
CBPO Location: Joe Macknis Memorial Conference Room (Fish Shack)

AGENDA

Thematic Focus: Addressing Sea Level Rise Impacts for the Chesapeake Bay

10:00 **Welcome, Introductions & Announcements** (Co-Chair Mark Bennett, USGS and Co-Chair Erik Meyers, The Conservation Fund)

- CERF Session this year in Mobile, Alabama focusing on a New Direction in Chesapeake Science
  - Abstracts are open for submission
- Maryland DNR is releasing community resiliency grants that promote projects addressing water quality and quantity through a watershed-scale planning approach.

10:10 **Sea Level Rise Predictions for Maryland** (Don Boesch, UMCES)

Material: Sea Level Rise Projections for Maryland 2018, Presentation

Mark addressed how the Chesapeake Bay Program modeling workgroup originally used the number 30 cm for RSLR (Relative sea level rise) by 2025 and then switched to 17 cm. This workgroup is tasked on suggesting to the management board what number the modeling workgroup should use in their model to represent RSLR by relooking at all the methods used to determine this factor.

Don presented on one method of projecting SLR (sea level rise) shown in the Sea-level rise Projections for Maryland 2018 report. The 2018 report took a different approach compared to the 2008 and 2013 reports by providing both a mean trend and probabilistic projections based on the method of Kopp et al. (2014) (K14). The probabilities allow for assessment of risks and are based upon three concentration pathways of greenhouse gas emissions – Growing emissions, Stabilized emissions, and Paris Agreement. Sea-level rise estimates are based on the expansion of ocean volume as a function of temperature, the loss of land-

based ice and ice from glaciers, change in ocean currents, and vertical movement of land. In the report, estimates are provided for the probability distribution over time and for three emissions pathways at Baltimore, but they can be adjusted for other Maryland locations. Don presented projections for Sewells Point from K14 which signifies the median 2030 RSLR is 24 cm. There is a note of caution that the rate of loss of ice from Antarctica may be significantly greater toward the end of this century if emissions continue to grow. This will greatly increase the rate of sea-level rise. It is difficult to calculate the meltdown of Antarctica because its ice sheets are grounded below sea-level, thus the problem is not the warming of air but the warming of the water so these ice sheets are undermined from below. The estimates shown in the report can be used to make risk-based decisions. If MD wants to act upon sea-level rise then the state needs to reduce their greenhouse gas emissions. Don introduced another method used by Virginia Institute of Marine Science (VIMS) which used a best non-linear fit to describe sea-level rise compared to a linear approach.

Jim asked if the Gulf Stream effects are taken into account for the results presented in the report. Don responded that it is not because they do not know if it causes a long term effect or a cyclic effect. However, it is known that the conveyor belt circulation is slowing down because there is more fresh cold water from the melting ice sheets.

Lew asked if the VIMS method took into account the gulf stream effects. Don pointed out that the downs/ups visible on the graph is affected by regional scale phenomenon.

Erik asked if methane was included in the study. Don stated that yes methane and other short lived greenhouse gases were accounted for in it.

10:40 **Sea Level Rise and Hypoxia** (Molly Mitchell, VIMS)

Material: Presentation

Molly presented on Projections for 2050 Sea-level rise in the Chesapeake Bay. They used local tide gauge-based projections in their study because global mean sea-level rise is based off a model. Global RSLR is different across the globe so people are not able to connect what is said to what is happening in their backyard. To calculate the downscaling projections for regional sea-level rise they used a quadratic function and took into account the change in global mean sea-level, the regional variation in sea-level from the global mean due to meteo-oceanographic factors, changes in earth's gravitational field, and change in sea-level due to vertical land movement. They used the monthly mean to remove

variation such as spring neap tides. The projections completed for Baltimore, Annapolis, and Norfolk show RSLR increasing at an exponential rate and not in a linear fashion. It also shows how the impact of SLR will be more extreme in Annapolis because the current high water lever is below the SLR projection.

Jennifer asked if there has been any work done on tidal stretches. Molly responded it is difficult to do. She knows of three papers which all show different results of what are the important parameters. There are just too many variables.

Don asked if the high tide levels were from NOAA. Molly confirmed it is from NOAA tidal datums and stated the data is probably lower than what it should be because it is from past tidal data, but she wanted to make a point that it varies.

Mark commented on how you can interact with the curves on this website.

11:10 **CBP Modeling Efforts and Sea Level Rise** (Richard Tian, UMCES)

Material: Presentation

Richard did not comment on modeling efforts in his presentation. He focused on SLR because Mark asked him to do more analysis on the projection results and compare different methods to show the workgroup numbers they could discuss. For his analysis, he looked at SLR for Sewells Point and Baltimore. He commented how there is a problem when looking at the linear function's residues because they are positive unlike for the quadratic function, the residues are in the middle which means there is no drift in time. The difference between the SLR for Sewells Point and Baltimore when using the quadratic function is significant so he looked at land subsidence. He found it is severe in the Southern Chesapeake Bay Region. With the provided information, it was then left to the workgroup to decide what number the CBP modeling workgroup should use for SLR.

Mark commented how the modeling workgroup can only use one number in the model. Historically they have chosen the number corresponding with Sewells point because that site governors the amount of water coming in from the mouth of the Bay.

Lew stated that the decision made today is based on the best understanding of the projections to 2025, and the decision will be revisited in 2025 with technical reviews prior to that date.

Don commented the DP projections which Richard used are based on faster ice melt and their validity has been downgraded. He notes how the K14 estimates he presented on are very similar to quadratic extrapolations.

Mark asked the workgroup if everyone agrees that the linear function is no longer an option. The workgroup agreed. Dave asked everyone if the workgroup agreed the site used will be Sewells Point and not Baltimore. Mark said you would need to ask the modeling workgroup. Lew stated the modeling group would probably come to the decision that it would be Sewells Point. Then the question was which method to choose the number from: K14 (This represents a model; 24 cm) or the method VIMS is using (The quadratic function; 21 cm). Multiple people suggested averaging between both the methods. Don emphasizes the benefit of using the K14 method is that after 2025 it is going to partly be based on greenhouse gas emissions so when trying to restore the bay it highlights the need to reduce emissions. Gary stated that other models they run use the average of different sources so there should be no problem with finding the average. Gary said the workgroup would need to produce a suggested number with a suggested range.

Mark asked if there is a benefit using VIMS method since it is based on data instead of another model result. Don comments how the K14 method is nationally used with many states. It is already in practice.

Mark asked if VA is using the VIMS number in the short term. Molly confirms the governor has recommended using it because it is important for decision makers to see where it number is coming from.

Lew comments using the average of both methods is beneficial because these two expert groups' work would move forward in the documentation, and the CBP could use a different number from either method for a different use then the one discussed today.

Zoe referenced VA is using one method, and MD is using anther method so SLR is going to be variable between the states.

Mark confirms the site chosen is Sewells Point because it is very influential for the whole bay circulation. The workgroup will present both methods (VIMs non-linear projection, 21 cm; K14, 24 cm) to the management board. They will average the two methods and use the number calculated as the number moving forward in a modeling perspective.

12:15 **Lunch**

1:00 **Chesapeake Bay Data and Mapping Repository Update** (Chris Lamie, ERG)

Material: Presentation

Chris presented a project overview which provides a "one-stop shopping" solution for internal and external users who seek data to answer questions about climate change in the Chesapeake Bay watershed. They already completed the planning and scoping step and the identify data sources and compile key information step. They currently are completing the curate the data and populate remaining fields. Their goal is to make it publicly accessible. They plan on sharing the project to the Climate Resiliency workgroup for input in April.

Gopal asked if the team is looking at data on how climate change will affect BMPs. Chris states it is very difficult to find layers or data sources so they do not have any, but if anyone knows where to get them, please direct them on where to go.

Peter suggested talking with the fish habitat health assessment team.

1:15 **CRWG Workplan Review/SRS process** (Mark Bennett, Jen Dopkowski)

Jen ran through the workplan to ask for edits from the workgroup. Jen will also present the workplan on *Thursday, February 28, 2019* to STAR for feedback. The workplan will be done on March 18th so it is ready for public comments. The public will have two weeks to comment. Jen will send out an email with the workplan including the edits below. She would like edits from workgroup members by *March 8th*.

Monitoring & Assessment Work Plan Management Approach 1: 1.1 – Zoe stated the workgroup should really maintain the 7 indicators and then mention the workgroup is exploring other opportunities to add other indicators later on. Jen mentioned to add back in the fish and tree canopy indicator in the management process. Peter said to include the bay temperature indicator as an exploring indicator. Jen mentioned that this action is tasked to the coordinator, but there currently isn't one so it is unclear who to give it to and what the timeframe for the indicator updates should be throughout the year.

Monitoring & Assessment Work Plan Management Approach 2: 2.1 – Zoe suggested changing the language to "addressing the report and putting it in front of the Climate Resiliency workgroup." Jen questioned who to designate the action to. Mark stated the management board has already asked for the workgroup to meet with the Water Quality GIT to determine which BMPs are the most important depending on climate change so Jen will change the language on that to "meeting with the WQ GIT."

Adaptation Work Plan Management Approach 2: 2.1 – Zoe suggested including the method from VIMS since it addresses the model projections from the MD report.

Adaptation Work Plan Management Approach 3: This statement needs to include “watershed” or “jurisdictions” if it is suppose to include them. Otherwise, those not touching the bay will exclude themselves from the actions.

2:45 **Wrap-Up** (Co-Chair Mark Bennett, USGS and Co-Chair Erik Meyers, The Conservation Fund)

Jen will see if she can get the Climate Resiliency workgroup on the Water Quality GIT agenda for their April meeting.

Next Meeting Dates: March 18, April 15

Participants: Mark Bennett, Gary Shenk, Jeremy Hanson, Zoe Johnson, Richard Tian, Gopal Bhatt, Lew Linker, Don Boesh, Jim George, Molly Mitchell, Ashley Gordon, Dave Montali, Jennifer DeMooy, Melissa Deas, Shannon Sprague, Adriana Grier, Rebecca Chillrnd, Jennifer Dopkowski, Erik Meyers, Cuiyin Wu, Breck Sullivan, Krista Grocholski, Nicole Carlozle, Taryn Sudol, Kate McClure, Angie Wei, Adrienne Kotula, Donna Bilkovic, Jeremy Cox, Kevin Du Bois, Laurel Abowd, Emily Trentacoste, Amanda Campbell