MARYLAND COMMISSION on CLIMATE CHANGE

Ben Grumbles, Chair

Scientific and Technical Working Group Meeting

Summary of January 14, 2019 Meeting

Meeting agenda and participants. The meeting was held at the University of Maryland Center for Environmental Science Office, Annapolis, Maryland. The agenda for this meeting follows this summary. Members of the Scientific and Technical Working Group (STWG) present in person or by teleconference were: Peter Goodwin (Chairman) , Ghassem Asrar, Russ Dickerson, Gerrit Knapp, Fernando Miralles-Wilhelm, David Vanko, Adel Shirmohammadi, Belay Demoz, Eric Davidson, Eric Wachsman, Jane Kirschling, Don Boesch.

Other attendees: Dave Nemazie, Jess Herpel, Paul Berman, Treasurer Nancy Kopp, Charles Glass.

Welcome and Introductions. Chairman Goodwin welcomed everyone to the first STWG meeting of 2019 and allowed everyone participating in the meeting to introduce themselves.

Maryland Sea-Level Rise Projections. Dr. Boesch discussed the 2018 Sea-level Rise Projections for MD 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 method of Kopp et al. (2014). 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. In Maryland between 2000 and 2050, the likely range (67% probability) of the relative mean sea-level rise is 0.8 – 1.6 ft. After 2050, the rate of sea-level rise depends on the greenhouse gas emission pathway. In 2150 if the emissions continue to grow, the likely range of sea-level rise is 3.4 – 6.6 ft. These projections in the 2018 report are consistent with the 2013 projections. 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. In addition, the report provided projections of frequent of high tide flooding ("Nuisance" flooding) due to sea-level rise. It found that an event that occurred a few days per year will become an event that occurs almost every day especially under the Growing Emissions scenario. Boesch explained that they have not created inundation maps yet because they plan to work with DNR and Coast Smart Council to produce maps using projections based on existing mapping tools to

avoid duplication and confusion. The message is if MD wants to act upon sea-level rise then we need to reduce our greenhouse gas emissions. It is more manageable to deal with the low range of possibilities so if we do not stop emissions we will be dealing with a growing problem that only gets worse later on in the century. These estimates can also be used to make risk-based decisions for whether a project needs to be based on lower or higher probabilities of sea-level rise.

Presentation Questions/Comments.
Did the analysis include regional differences. Boesch responded with yes, and some examples of this in the report is the description of relative sea-level rise at Solomons Island and Cambridge due to increased groundwater withdrawal in these areas.

Dickerson asked if the increased rate of precipitation is included in the analysis. Boesch responded by saying it doesn't affect the annual projections that the report is providing.

TReasurer Kopp commented on how now we have the science so the next step is translating it to public policy. The Board of Public Works has not gotten to the point of understanding impacts of climate change and adapting to them to preserve some of the projects.

Chairman Goodwin closed this part of the meeting by addressing how other states have incorporated these methods and have put in statutes. He also expresses how these projections are beginning to narrow which means the science is getting better, stronger, and more defensible.

Forum on Impacts to Agriculture. Dave Nemazie provided an overview of the Forum on the Impacts of Climate Change on Agriculture in Maryland held on October 15, 2018. The report is not completed. The workshop brought together stakeholders, agency participants, scientists, and NGOs. It focused on six topics: Best Management Practices (BMPs) and their effect on TMDLs, saltwater intrusion, invasive plants/insects, animal/crop adaptation, carbon sequestration/soil health, and biomass and waste for bioenergy. The entire group was concerned about climate change, but some of their main concerns were rising sea-levels and variable weather conditions. Many of the agricultural hubs are near MD's coastline, and as sea-level rises, they are becoming more vulnerable to saltwater intrusion. Farms are slow to recover once inundated with saltwater, and many of the crops cannot survive. Climate change is also causing warmer and wetter conditions. Farmers are going from drought conditions to standing water on their land causing them to change the way they manage their acres and puts economic viability at risk. The agriculture community is looking for new information tools to support their decisions and economic assistance from the government or public-private partnerships to help them incorporate practices adapted to the changing climate. A subject discussed for future research is the effectiveness of BMPs. Current BMPs are based upon today's climate, but climate change is causing shifts in temperature, precipitation and other aspects which will likely make current BMPs inefficient in reducing pollutant discharge. As a result, BMPs need to be reevaluated to help MD reach the Chesapeake Bay Total Maximum Daily Load (TMDL).

Adel Shirmohammadi also helped with the forum and reiterated that TMDLs will fail based on current BMPs and need to have more implemented.

2018 MCCC Annual Report. Chairman Goodwin summarized the implications of the 2018 Maryland Commission on Climate Change Annual Report. He expressed how people felt the report captured where MD is right now but fell short in immediate actions. Members are concerned if the proposed actions will be enough to reach 40% by 2030. A Minority Report was written which provided recommendations for the Commission to help MD reduce and adapt to the impacts of climate change. Chairman Goodwin believes the Commission will come back due to these reports to consider what additional actions can be taken by the state.

Development of a Work Plan for 2019. Chairman Goodwin asked for anyone's opinion on what they thought the STWG should be working on in 2019. The discussion on the potential STWG contributions focused how science can inform MCCC and Greenhouse Gas Reduction Act (GGRA) recommendations and goals. Tasks for the 2019 Work Plan may include:

- Accounting for and measuring the greenhouse gas sources and sinks from forests, wetlands and agricultural land. This involves understanding the impact of climate change on these systems and which areas are vulnerable. It was suggested to conduct or analyze pilot projects to show the benefits of carbon sequestration in forests, wetlands and agricultural soils.
- Helping MDE with their inventories and actions on replacing fossil fuels because without a transition to renewable energy, there will not be a substantial decrease in greenhouse gas emissions. This may include accounting for other greenhouse gas emissions such as nitrous oxide.

The state is drafting a GGRA Plan update, and by the end of 2019, the plan will be finalized. STWG will propose to help MDE with before the draft is released, but if unable to, will read over the draft and discuss where they could provide the most beneficial use before it is finalized. STWG will also take into consideration how the state is distributing the work so that universities and other entities may be of assistant and ask what resources MDE needs to finalize the plan. Therefore, the 2019 Work Plan will be adjusted accordingly once the GGRA Plan is drafted.

Wrap-Up and Next Steps. Chairman Goodwin confirmed the MCCC Steering Committee meeting on January 24, 2019 and stated the information from this STWG meeting will be a part of the discussion. Next steps will include reviewing the GGRA Plan and meeting soon after it is released.

Public Comments. Opportunity for comments from the general public was provided, but there were no members of the public present or on the conference phone to offer comments.