Chesapeake Bay TMDL 2017 Midpoint Assessment
Policy Approach and Implementation Considerations for Addressing Climate Change in Jurisdictions' Phase III Watershed Implementation Plans

CBP Climate Resiliency Workgroup
PSC Briefing Document
12.11.17

Background:

Informed by the outcomes of the Midpoint Assessment's climate change modeling assessment, the Chesapeake Bay Program (CBP) Partnership is scheduled to decide on December 19-20, 2017 how to incorporate climate change considerations into the jurisdictions'[1] Phase III Watershed Implementation Plans (WIPs). To inform this process, the CBP Climate Resiliency Workgroup (CRWG) was tasked with informing the climate change projections and scenarios for input into the watershed and estuarine modeling efforts; exploring the range of policy options for addressing climate change in the Phase III WIPs; and, developing policy implementation guidance for the Partnership's consideration. Reference materials for each of the activities, as well as the Partnership's overall climate change decision-making process, are contained in Appendix A.

Outlined below is additional information to guide the Partnership in the final stages of the decision-making process with regards incorporating climate change in Phase III WIPs.

Decision-Process

On December 13, 2016, the CBP Partnership Principals' Staff Committee (PSC) approved the proposed climate change assessment procedures for determining the projected mid-term (2025) and long-term (2050) impacts on the Chesapeake Bay watershed loads and the Chesapeake Bay water quality; and a set of Guiding Principles for Phase III WIP development and implementation. The PSC did not reach a decision on how to incorporate climate change considerations into the Phase III WIPs at either its December 13, 2016 or October 30, 2017 meetings, but agreed to the following:

1) evaluate how a numerical or "quantitative" policy approach[2] would play out based on additional modeling results as they become available; and
2) approved revisions to programmatic policy approach language[3], as recommended by the WQGIT.

---

[1] Jurisdictions include the six Bay Watershed states (NY, PA, MD, DE, WV, VA) and the District of Columbia.

[2] *Numerical "Quantitative" Policy Approach - Factor Climate Change into Phase III WIPs Base Conditions*: Use the 2025 climate projection scenarios as base conditions (informed by CBWM climate modeling results) in the establishment of the jurisdictions' Phase III WIPs. The climate change projection would be an added load that the jurisdictions would need to address in addition to their Phase III WIP planning targets, thereby increasing the level of effort.

[3] *Programmatic "Qualitative" Policy Approach - Optimize Phase III WIP Development and Adaptively Manage BMPs:* Within a practical time-period applicable to an individual source sector, initiative or action, the Partnership will consider new information on the performance of BMPs, including the contribution of seasonal, inter-annual climate variability, and weather extremes. Jurisdictions will assess this information and their support programs and adjust plans through the two-year milestone process to implement their Phase III WIPs to better mitigate anticipated increases in nitrogen, phosphorus, or sediment due to climate change. Jurisdictions will provide a narrative consistent with the Guiding Principles that describes their programmatic commitments to address climate change in their Phase III WIPs.

Final decisions related to how to incorporate climate change considerations into the jurisdictions' Phase III Watershed Implementation Plans (WIPs) are scheduled for the PSC on December 19-20, 2017.

WQGIT Requested Decisions:

The WQGIT is requesting the PSC's concurrence with its recommendations, as follows:

1) Approve the WQGIT-proposed dual approach to factor climate change into the Phase III WIPs.
2) Approve the WQGIT's recommendation to provide flexibility to jurisdictions and establish a commitment for CBP programmatic support (e.g., guidance, data, funding, etc.), for implementation of climate change policies that exceed the Partnership approved policies.

Policy Approaches

In support of the Partnership's decision-making process, the CRWG recommended consideration of two policy approaches to address climate change in Phase III WIPs: a numerical (quantitative) and programmatic (qualitative) approach. It was envisioned that the two approaches, described below, could be implemented in tandem, or one in lieu of the other.

Numerical Approach – A "quantitative" approach that would result in an increased level of effort to meet water quality standards. The approach would account for the increased pollutant loads to each jurisdiction's portion of the Bay watershed, based on the Phase 6 assessment of watershed loads and the Bay's assimilative capacity. This approach would treat the estimated cumulative effect of changed conditions due to climate change similarly to the approved approach to account for growth. Jurisdictions would develop Phase III WIPs, which account for the estimated increased pollutant loads.

Pros	Cons
• Comprehensive, straight-forward approach. • Demonstrates Partnership's commitment to *Chesapeake Bay Agreement Climate Resiliency Goal*. • Near-term response. • Implemented in sequence with development of the Phase III WIPs.	• Increase in the level of effort required to meet water quality standards. • If implemented in isolation, would not address the anticipated impacts of climate change on BMPs.

Programmatic Approach - An "adaptive management approach" to be implemented through the two-year milestone process. If implemented as a stand-alone approach, this would not change jurisdictions' planning targets. This approach would direct the Partnership to collect and consider new information on the performance of BMPs, including the contribution of seasonal, inter-annual climate variability, and weather extremes. Jurisdictions would assess this information and adjust plans, over-time, to better mitigate anticipated changes in loads and impacts on the performance of BMPs. The inclusion of a narrative strategy in Phase III WIPs, describing jurisdictions' programmatic commitments to address climate change would be required. The Partnership has approved "*Guiding Principles*" for incorporating

climate considerations in both Phase III WIP development and implementation. A sample "*narrative strategy*" would be provided to jurisdictions to guide implementation.[4]

Pros	Cons
• Would allow for adaptively managing for long-term change. • Allows for use of local expertise and knowledge. • Provides for learning across jurisdictions about methods and results. • Allows for flexibility in jurisdictions' approaches to addressing climate change. • Would set standard elements for Phase III WIPs.	• If implemented as a stand-alone approach, it would delay substantive action to address climate change in the near-term. • Lack of specific technical understanding to guide implementation. • Requires additional monitoring and assessment efforts. • Could lead to inconsistency in implementation across jurisdictions.

WQGIT Recommendation to the PSC: Adopt a dual approach (programmatic and numerical) to factor climate change into the Phase III WIPs

1. Adopt a programmatic approach to address climate change.

    a) Include a narrative strategy in the Phase III WIPs that describes the jurisdictions' current action plans and strategies to address climate change, as well as the jurisdiction-specific nutrient pollutant loadings due to 2025 climate change conditions (derived using the planning targets methodology).

    b) Incorporate local priorities (e.g., flooding) and actions to address climate change impacts.

    c) Document the current understanding of the science and identify the research gaps and needs, and what we hope to learn over time given the current state of uncertainty (e.g., a better understanding of the BMP responses, including new or other emerging BMPs, to climate change conditions).

    d) Identify a date by which the Partnership will provide additional science and information to help inform implementation efforts to address climate change (early 2021 to inform 2022-2023 milestones?).

2. Document and communicate additional nutrient pollutant loads[5] of up to 9 million pounds of nitrogen and 0.5 million pounds of phosphorus due to 2025 climate change conditions.

    • Continue to understand the nature and effect of climate change impacts in the watershed and estuary to inform management strategies (e.g., WIP/2-year milestones).

[4] The CRWG has compiled informational material, including a "Sample Narrative Template," outlining a potential method for implementation of this policy approach (See Appendix B). Once the Partnership reaches agreement on the approach to consider climate change in Jurisdictions' Phase III WIPs, formal implementation guidance will be developed and approved by the CRWG and WQGIT.

[5] Nutrient loads based on final Phase 6 Watershed Modeling and Water Quality Sediment Transport climate change assessment results, presented to the WQGIT on December 4-5, 2017.

- By [insert date], develop recommendations for new and/or refined methods and modeling techniques to better assess projected impacts on watershed loads and estuarine impacts for a range of future scenarios, including the methodology used to develop jurisdiction-specific nutrient pollutant loads due to 2025 climate change conditions.
- By [insert date], consider results of updated methods, techniques, and studies and revisit whether to explicitly account for those additional nutrient pollutant loads due to 2025 climate change conditions in the Phase III WIPs and/or 2-year milestones.
- Identify a date (post-2025) by which the Partnership will fully address the additional nutrient pollutant loads in a Phase III WIP addendum and/or 2-year milestones.

3. Provide jurisdictions with the flexibility to explicitly account for additional nutrient pollutant loadings due to 2025 climate change impacts in their Phase III WIPs and/or 2-year milestones prior to the Partnership agreed-upon date and establish a commitment for CBP programmatic support (e.g., guidance, data, funding, etc.), for support implementation.

Appendix A: Reference Material

Climate Change Projections and Scenarios

Chesapeake Bay Program, 2016. Climate Resiliency Workgroup. Recommendations on Incorporating Climate-Related Data Inputs and Assessments: Selection of Sea Level Rise Scenarios and Tidal Marsh Change Models to Inform the Chesapeake Bay TMDL 2017 Mid-Point Assessment (August 5, 2016).

Johnson, Z., M. Bennett, L. Linker, S. Julius, R. Najjar, M. Mitchell, D. Montali, R. Dixon, 2016. *The Development of Climate Projections for Use in Chesapeake Bay Program Assessments*. Chesapeake Bay Program Scientific and Technical Workgroup. Annapolis, MD.

NOAA Technical Report NOS CO-OPS 083. "Global and regional sea level rise scenarios for the United States. January 2017. Available at: https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf

US Council on Environmental Quality. 2016. Climate Resilience Toolkit, Climate Explorer. Available at: https://toolkit.climate.gov/

Modeling Documentation and Decision-Support Materials

- Chesapeake Bay Program, Modeling Team. 2016. Principals' Staff Committee Briefing Document: *Preliminary Phase 6 Watershed Model and Chesapeake Bay Water Quality Sediment Transport Model Climate Change Assessment Procedures and Scenarios for the 2017 Midpoint Assessment* (December 13, 2016).
- Draft Phase 6 Watershed Model Documentation
- Draft 2017 Watershed Quality Sediment Transport Model Documentation

STAC Peer Review Documents

- Chesapeake Bay Program Partnership's Climate Change Assessment Framework and Programmatic Integration and Response Efforts: Request for STAC Peer Review
- STAC Peer Review Report (in press)
- Peer Review Documentation
- Peer Review Webinar

Policy Option Briefing Memorandums and Decision-Support Materials

Chesapeake Bay Program, Climate Resiliency Workgroup. 2016. Water Quality Goal Implementation Team Briefing Document: *Guiding Principles and Options for Addressing Climate Change Considerations in the Jurisdictions' Phase III Watershed Implementation Plans* (October 11, 2016)

Chesapeake Bay Program, Climate Resiliency Workgroup. 2016. Principal Staff Committee Briefing Document: *Guiding Principles and Options for Addressing Climate Change Considerations in the Jurisdictions' Phase III Watershed Implementation Plans* (December 13, 2016)

Chesapeake Bay Program, Climate Resiliency Workgroup. 2017. Water Quality Goal Implementation Team Briefing Document: P*olicy Options and Implementation Considerations for Addressing Climate change in Jurisdictions' Phase III Watershed Implementation Plans* (September 6, 2017).

Chesapeake Bay Program, Climate Resiliency Workgroup. 2017. Water Quality Goal Implementation Team Briefing Document: P*olicy Approach and Implementation Considerations for Addressing Climate change in Jurisdictions' Phase III Watershed Implementation Plans* (November 29, 2017).

Chesapeake Bay Program, Climate Resiliency Workgroup. 2017. Fact Sheet. *Resilient BMPs: Planning Tools and Resources* (November 2017).

Johnson, Z. et. al. *STAC Workshop Report: Monitoring and Assessing Impacts of Changes in Weather Patterns and Extreme Events on BMP Siting and Design.* (in press).

Chesapeake Bay Program, Climate Resiliency Workgroup. Fact Sheet: *Climate Resiliency Principles for Phase III WIPs* http://www.chesapeake.org/stac/workshop.php?activity_id=280 (in press).

CBP Partnership Decision-Support Presentations

Oct 24-25, 2016 WQGIT Presentation
November 16, 2016 CAC Presentation
December 1, 2016 LGAC Presentation
Dec. 13, 2016 PSC Presentation
December 19, 2016 CRWG Presentation
March 23, 2017 LGAC Presentation
May 8, 2017 Climate Change Webinar
June 19, 2017 CRWG Presentation
August 28, 2017 CRWG Presentation
September 19, 2017 Climate Change Webinar
September 26, 2017 WQGIT Presentation
October 16, 2017 CRWG Presentation
October 17, 2017 Modeling WG Presentation
October 30, 2017 PSC Presentation
November 13, 2017 WQGIT Presentation
December 4-5, 2017 Joint Modeling-WQGIT Presentation

Public Comments

Choose Clean Water. Letter to Secretary Ben Grumbles, Chair, Principal Staff Committee, 28 November 2017. TS

Choose Clean Water. Letter to Secretary Molly Ward, Chair, Principal Staff Committee, 2 January 2017. TS

Appendix B. Programmatic Policy Approach: Guidance Example

(Under development by the Climate Resiliency Workgroup and Water Quality Goal Implementation Team)[6]

Programmatic "qualitative" Policy Approach: Optimize Phase III WIP Development and Adaptively Manage BMP Implementation

Description: Within a practical time-period applicable to an individual source sector, initiative or action, the Partnership will consider new information on the performance of BMPs, including the contribution of seasonal, inter-annual climate variability, and weather extremes. Jurisdictions will assess this information and their support programs and adjust plans through the two-year milestone process to implement their Phase III WIPs to better mitigate anticipated increases in nitrogen, phosphorus, or sediment due to climate change. Jurisdictions will provide a narrative consistent with the Guiding Principles that describes their programmatic commitments to address climate change in their Phase III WIPs.

Implementation Considerations: The CBP's assessment of the projected impacts and modeling results of climate change in 2025 and 2050 for a range of scenarios would be relayed to the jurisdictions. The jurisdictions would include a narrative strategy in their Phase III WIPs, outlining their programmatic and/or numeric commitments to address projected impacts consistent with the Guiding Principles, outlined below (approved by the PSC on December 13, 2016).[7] Narrative strategies could vary across jurisdictions; however, by following a "narrative template," they could be standardized or harmonized to provide for transparency, accountability, and consistency. EPA could potentially use these elements as a guide to evaluate the proposed narrative strategies in the Phase III WIPs.

To inform implementation, over the longer-term, it is expected that the Partnership would need to work together to facilitate the collection and evaluation of BMP performance data. This will enable the Partnership to learn more about BMP performance and the sensitivity of BMPs that are attributable to climate change, to allow for consideration of these factors while adaptively managing for long-term change. Periodically, in support of this action, the CBP Partnership, through STAC working consultatively with CRWG, could compile and assess the latest climate and ecosystem science, research, or data, and relay this information to jurisdictions.

Sample Narrative Template:

I. Scientific Assessment and Conclusions

---

[6] Appendix B includes informational material compiled by the CRWG, including a "Sample Narrative Template." This document outlines a potential means and method for implementation of the proposed programmatic policy approach. Once the Partnership reaches agreement on the approach to consider climate change in Jurisdictions' Phase III WIPs, formal implementation guidance will be developed and approved by the CRWG and WQGIT.

[7] Jurisdictions should also reference Chesapeake Bay TMDL, Section 7: Reasonable Assurance and Accountability Framework; and, Section 10: Implementation and Adaptive Management for guidance on developing narrative strategies.

a) The CBP's assessment of the projected impacts and modeling results of climate change in 2025 and 2050 for a range of scenarios would be relayed to the jurisdictions. In response, jurisdictions should describe method(s) for gathering and assessing additional scientific data and information. This element allows for flexibility in jurisdictions' approaches to addressing climate change, and can incorporate local knowledge and information where quantitative data may be lacking.
b) Identify conclusions based on scientific assessments.
c) Address how the scientific conclusions guided their programmatic and/or numeric commitments. Jurisdictions should use local expertise and knowledge along with the latest climate information and science to inform their programmatic and/or numeric commitments.

II. Programmatic and/or Numeric Commitments

a) Outline programmatic and/or numeric commitments to address projected impacts consistent with the Climate Resiliency Guiding Principles. Commitments may vary across jurisdictions but could include activities such as undertaking demonstration projects; prioritizing implementation of climate-resilient BMPs; approaches for assessing vulnerability of planned BMPs; or enhancing plans, policies, regulations or on-the-ground efforts to address impacts, etc. Jurisdictions could also pursue BMPs with clear co-benefits and climate change-related positive impacts (e.g., habitat restoration and flood control).

III: Phase III WIP Development: Planning and Scoping[8]

a) Describe the process used to guide Phase III WIP development, in accordance with the approved Climate Resiliency Guiding Principles for WIP Development:

1. *Capitalize on "Co-Benefits"* – maximize BMP selection to increase climate or coastal resiliency, soil health, flood attenuation, habitat restoration, carbon sequestration, or socio-economic and quality of life benefits.
2. *Account for and integrate planning and consideration of existing stressors* – consider existing stressors such as future increase in the amount of paved or impervious area, future population growth, and land-use change in establishing reduction targets or selection/prioritizing BMPs.
3. *Align with existing climate resiliency plans and strategies* – align with implementation of existing greenhouse gas reduction strategies; coastal/climate adaptation strategies; hazard mitigation plans; floodplain management programs; fisheries/habitat restoration programs, etc.
4. *Manage for risk* and p*lan for uncertainty* – employ iterative risk management and develop robust and flexible implementation plans to achieve and maintain the established water quality standards in changing, often difficult-to-predict conditions.
5. *Engage Local Agencies and Leaders* – work cooperatively with agencies, elected officials, and staff at the local level to provide the best available data on local impacts from climate change and facilitate the modification of existing WIPs to account for these impacts.

IV. Phase III WIP Implementation: BMP Evaluation Process[9]

[8] See Johnson, Z. et. al. In-Press. *STAC Workshop Report: Monitoring and Assessing Impacts of Changes in Weather Patterns and Extreme Events on BMP Siting and Design.* (in press) for more information and guidance on implementation.

[9] See Johnson, Z. et. al. In-Press. *STAC Workshop Report: Monitoring and Assessing Impacts of Changes in Weather Patterns and Extreme Events on BMP Siting and Design.* (in press) for more information and guidance on implementation.

a) Describe the process used by jurisdictions to implement WIP programmatic and/or numeric commitments, including proposed the qualitative and/or quantitative evaluation of and implementation of BMPs, in accordance with the approved Climate Resiliency Guiding Principles: WIP Implementation.

1. *Reduce vulnerability* - use "Climate-Smart" principles to site and design BMP's to reduce future impact of sea level rise, coastal storms, increased temperature, and extreme events on BMP performance over time. Vulnerability should be evaluated based on the factor of risk (i.e. consequence x probability) in combination with determined levels of risk tolerance, over the intended design-life of the proposed practice.

2. *Build in flexibility and adaptability* - allow for adjustments in BMP implementation in order to consider a wider range of potential uncertainties and a richer set of response options (load allocations, BMP selections, BMP redesign). Use existing WIP development, implementation and reporting procedures, as well as monitoring results and local feedback on performance, to guide this process.

V. Documentation, Reporting and Adaptive Management

a) Establish a timeline for submission of documentation and reporting on all of the above. Reporting should include findings of new or updated scientific assessments and resulting changes to Phase III WIPs, including adjustments to two-year milestones. Documentation, reporting, and adaptive management shall be administered in accordance with Chesapeake Bay TMDL, Section 7: Reasonable Assurance and Accountability Framework[10]; and, Section 10: Implementation and Adaptive Management[11].

b) Jurisdictions would identify programmatic and/or numeric efforts and plans to adaptively manage. Jurisdictions should describe processes that will allow for changes in BMP selection or WIP implementation, over-time, as new climate and ecosystem science, research, or data becomes available and the understanding of the impact of how changing seasonal, inter-annual climatic, and weather conditions may affect the performance of watershed restoration practices.

[10] Chesapeake Bay TMDL, Section 7: Reasonable Assurance and Accountability Framework
[11] Chesapeake Bay TMDL, Section 10: Implementation and Adaptive Management