Chesapeake Bay TMDL 2017 Mid-Point Assessment
Guiding Principles, Policy Provisions and Implementation Guidance for Addressing Climate Change Considerations in the Jurisdictions' Phase III Watershed Implementation Plans

Chesapeake Bay Program Partnership
Climate Resiliency Workgroup
Draft 03.0818

I. Guiding Principles[1]

Jurisdictions should adhere to the following principles when developing and implementing Phase III WIPs:

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.

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.
3. *Adaptively manage* - Allow for changes in BMP selection or WIP implementation, over-time, as new climate and ecosystem science, research, or data becomes available and the

[1] Approved by the PSC (12.13.16)

understanding of the impact of how changing seasonal, inter-annual climatic and weather conditions may affect the performance of watershed restoration practices. Consider new science on climate change impacts in future BMP Expert Panels, following the CBP partnership's BMP Expert Panel Protocols.

II. Policy Provisions[2]

1. Incorporate Climate Change in the Phase III WIPs

- Include a narrative strategy in the Phase III WIPs that describes the state and local jurisdictions' current action plans and strategies to address climate change and commit to adopting climate change targets by 2021, employing the Partnership's suite of models that factor in climate change and other relevant local information. Acknowledging the challenges that lie ahead, reference the *preliminary* modeling estimates attributable to climate change by 2025 to be roughly an additional 9 million pounds of nitrogen and 0.5 million pounds of phosphorus.

2. Understand the Science

- By refining the climate modeling and assessment framework, continue to sharpen the understanding of the science, the impacts of climate change, and any research gaps and needs.
- Develop an estimate of pollutant load changes (nitrogen, phosphorus, and sediment) due to 2025 climate change conditions.
- Develop a better understanding of BMP responses, including new, enhanced and resilient BMPs, to better address climate change conditions such as increased storm intensity.
- In March 2021, the Partnership will consider results of updated methods, techniques, and studies and refine estimated loads due to climate change for each jurisdiction.
- In September 2021, jurisdictions will account for additional nutrient and sediment pollutant loads due to 2025 climate change conditions in a Phase III WIP addendum and/or 2-year milestones beginning in 2022.

3. Incorporate into Milestones

- Starting with the 2022-2023 milestones, the Partnership will determine how climate change will impact the BMPs included in the WIPs and address these vulnerabilities in the two-year milestones.

III. Implementation Guidance for Incorporating Climate Change Phase III WIPs

In accordance with the policy provisions approved by the PSC on March 2, 2018, jurisdictions' shall include a narrative strategy in the Phase III WIPs that describes the state and local jurisdictions' current action plans and strategies to address climate change and commit to adopting climate change targets by 2021, employing the Partnership's suite of models that factor in climate change and other relevant local information.

Provisional language approved by the PSC (03.02.18)

Narrative strategies should also be consistent with the Guiding Principles, approved by the PSC on December 13, 2016.[3] Narrative strategies may vary across jurisdictions; however, by following a "narrative template," they could be standardized or harmonized to provide for transparency, accountability, and consistency.

Narrative Template[4]*:*

I. Scientific Assessment and Conclusions

a) The CBP's assessment of the projected impacts and 2025 modeling results of climate change will be relayed to the jurisdictions. Acknowledging the challenges that lie ahead, the narrative strategies should reference the *preliminary* modeling estimates attributable to climate change by 2025 to be roughly an additional 9 million pounds of nitrogen and 0.5 million pounds of phosphorus. If applicable, jurisdictions should also 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 any numeric commitments that describe current action plans and strategies to address climate change, as well as the jurisdiction-specific nutrient and sediment pollution loadings due to 2025 climate change conditions. Incorporate priorities and actions to address climate change impacts. 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

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

[3] 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.

[4] The CRWG has compiled the "Narrative Template," as a potential method for implementation of the PSC approved policy provisions for addressing climate change in Phase III WIPs. Revisions to the draft narrative template may be issued upon additional review and consideration of the CRWG and WQGIT.

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[5]

a) Describe the process used by jurisdictions to implement WIP programmatic and/or numeric commitments, including any 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[6]; and, Section 10: Implementation and Adaptive Management[7].

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.

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[5] See Johnson, Z. et. al. (2018). *STAC Workshop Report: Monitoring and Assessing Impacts of Changes in Weather Patterns and Extreme Events on BMP Siting and Design.* for more information.

[6] Chesapeake Bay TMDL, Section 7: Reasonable Assurance and Accountability Framework

[7] Chesapeake Bay TMDL, Section 10: Implementation and Adaptive Management

VI. Reference Material

- Fact Sheet: *Climate Resiliency Principles for Phase III WIPs*
- Fact Sheet: *Resilient BMP Planning Tools and Resources*
- STAC Workshop Report: *Monitoring and Assessing Impacts of Changes in Weather Patterns and Extreme Events on BMP Siting and Design* (2018).

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
- CBP Peer Review Response (under development)

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. Principal Staff Committee Briefing Document: *Guiding Principles and Options for Addressing Climate Change Considerations in the Jurisdictions' Phase III Watershed Implementation Plans* ()

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

Johnson, Z., S. Julius, J. Fischbach, M. Bennett, B. Benham, D. Sample, and K. Stephenson. 2018. Monitoring and Assessing Impacts of Changes in Weather Patterns and Extreme Events on BMP Siting and Design. STAC Publication Number 18-004, Edgewater, MD. 48 pp.

Chesapeake Bay Program, Climate Resiliency Workgroup. Fact Sheet: *Climate Resiliency Principles for Phase III WIPs.*

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
December 22, 2018 PSC Presentation
March 2, 2018 PSC 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

Choose Clean Water. Letter to Secretary Ben Grumbles, Chair, Principal Staff Committee, February 2018. TS