

***Proposal for Responsive STAC Workshop on:***

*Monitoring and Assessing Impacts of Changes in Weather Patterns and Extreme Events on BMP Siting and Design*

**Submitted by:**

Zoë Johnson (NOAA Chesapeake Bay Office) and Susan Julius (EPA/ORD, STAC Member) on behalf of Climate Resiliency Working Group

**Steering Committee**

\*Confirmed

Zoe Johnson (Chair)\*: Coordinator of the CBP Climate Resiliency Workgroup; extensive expertise in adaptation planning at federal, state, regional and local levels

Susan Julius\*: STAC Member and EPA senior scientist with expertise in conducting vulnerability, risk, and adaptation assessments for aquatic and urban systems

Mark Bennett\*: CBP Climate Resiliency Workgroup co-chair and Director of the USGS VA/WV Water Science Center, which conducts research related to water resources

Brian Benham\*: Extension Specialist and Professor, Department of Biological Systems Engineering, Virginia Polytechnic Institute and State University, Blacksburg.

David Sample\*: Associate Professor and Extension Specialist, Department of Biological Systems Engineering, Virginia Tech

Kurt Stephenson\*: Professor, Environmental and Natural Resource Economics, Department of Agricultural and Applied Economics, Virginia Tech

Jordan Fishback\*: Policy Researcher at the RAND Corporation and co-director of the Water and Climate Resilience Center. He is leader in climate adaptation, water resources management, and coastal planning.

CBP Urban Stormwater Workgroup Representative: A member of the Urban Stormwater Workgroup will be appointed to the Steering Committee at the recommendation of the Water Quality Goal Implementation Team.

**Description of the Workshop**

A two-day workshop, to be held early the Fall of 2017, for the purposes of: 1) assessing the state of the knowledge on how anticipated changes in weather patterns and extreme events may affect the structural integrity of a subset (to be further defined by the Workshop Steering Committee) of urban stormwater, agriculture, and stream restoration Best Management Practices (BMPs) over time; 2) compiling siting and design guidelines to reduce the future impact of sea level rise, coastal storms, increased temperature and extreme events on BMPs; and, 3) identifying remaining gaps and highest priority needs (i.e., research, monitoring measures, programmatic efforts) to address in order to better inform and improve BMP development and implementation.

**Justification for Proposed Topics**

*Background:* Informed by the outcomes of the Midpoint Assessment modeling assessment, the Chesapeake Bay Program (CBP) Partnership is expected to decide, by December 2017, when and how to incorporate climate change considerations into the jurisdictions' Phase III Watershed Implementation Plans (WIPs). As a lead up to the December, 2017 decision-making process, the CBP Principal Staff Committee approved a set of guiding principles and a range of policy options, including both quantitative and qualitative measures, to address climate change in the Phase III WIPs in December, 2016. Guiding Principles for WIP Implementation were approved

as follows:

1. *Reduce vulnerability* - use “Climate-Smart” principles to site and design BMPs to reduce future impact of sea level rise, coastal storms, increased temperature, and extreme events on BMP performance, over time.
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 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.

Between now and December, 2017, the PSC directed the Partnership to consider implementation of one quantitative policy option (Factor Climate Change into Phase III WIP Base Conditions) and two qualitative policy options, as described below:

*Factor Climate Change into Phase III WIP BMP Optimization.* During the development of Phase III WIPs, jurisdictions would prioritize the selection of BMPs that will better mitigate the anticipated increased nitrogen, phosphorus and sediment loads due to the projected effects of climate change from the present through 2025 or 2050.

*Adaptively Manage Phase III WIP BMP Implementation.* During each two-year milestone development period, jurisdictions would consider new information on the performance of existing BMPs, including the contribution of seasonal, inter-annual climate variability and weather extremes on BMP performance. When there is a detectable impact on the effectiveness of a BMP performance, jurisdictions would use this information to re-prioritize the selection of BMPs to implement in the Phase III WIPs that will better mitigate the anticipated increased in nitrogen, phosphorus, and sediment loads.

*Justification:*

These policy options are under consideration by the CBP Partnership and appear to be favorable among jurisdictions over a quantitative approach. However, it should be recognized that near-term technical feasibility to support implementation of the qualitative options outlined above is limited. There is a general lack of technical understanding of the response of almost all CBP Partnership approved BMPs to anticipated changes in weather patterns and extreme events and a general lack of siting and design guidance on how to reduce the vulnerability of BMPs to sea level rise, coastal storms, increased temperature, and extreme events.

Therefore, STAC assistance is requested to design and facilitate a workshop to: 1) assess the state of the knowledge on how anticipated changes in weather patterns and extreme events may affect the structural integrity of urban, agriculture, and coastal Best Management Practices

(BMPs) over time; 2) compile siting and design guidelines to reduce the future impact of sea level rise, coastal storms, increased temperature and extreme events on BMPs; and, 3) identifying the remaining gaps and highest priority needs (i.e., research, monitoring measures, programmatic efforts) to address in order to better inform and improve BMP development and implementation?

These policy options are consistent with recommendations from the STAC Workshop: *The Development of Standardized Climate Projections for Use in Chesapeake Bay Program Assessments* (March 2016), which recommended, “Beyond the 2017 Midpoint Assessment, it is recommended that the CBP use 2050 projections for best management practice (BMP) design, efficiencies, effectiveness, selection, and performance – given that many of the BMPs implemented now could be in the ground beyond 2050.”

This proposal is one of two STAC workshop proposals, submitted in 2017, that focus on BMP performance. The focus of each is unique and complements the other. This workshop proposal “Monitoring and Assessing Impacts of Changes in Weather Patterns and Extreme Events on BMP Siting and Design” seeks to assess how changes in long-term weather patterns and extreme weather events may affect the way BMPs need to be designed in order to accommodate anticipated climatic changes and uncertainties. The second workshop proposal “Consideration of BMP Performance Uncertainty in Chesapeake Bay Program Implementation” focuses on the uncertainty about BMP nutrient removal effectiveness. The second workshop seeks to develop recommendations related to how BMP performance uncertainty is treated in the Chesapeake Bay Program’s BMP approval process and the Bay model, and how BMP performance uncertainty may be considered as watershed implementation plans (WIPs) are developed. Recommendations from the second workshop proposal will eventually provide a framework for how uncertainties arising from this workshop -- changes in long-term weather patterns -- are considered in the Bay model and watershed implementation planning.

#### *Workshop Design:*

The workshop will address the following questions:

- What are the general principles of BMP siting and design to reduce the vulnerability of urban, agriculture, and coastal BMP’s to future impacts of sea level rise, coastal storms, increased temperature, and extreme events?
- How flexible or adaptable are BMPs to anticipated changes in weather patterns and extreme events and what types of adjustments (e.g., retrofits) in BMP design to maintain structural integrity?
- What suite of BMPs are most robust (e.g., mitigate the anticipated increased nitrogen, phosphorus, and sediment loads) to anticipated changes in weather patterns and extreme events?
- What are the remaining gaps and highest priority needs (i.e., research, monitoring measures, programmatic efforts) to address in order to better inform and improve BMP development and implementation?

#### **Management Implications**

The results of the workshop will support ongoing development and implementation of Bay

jurisdictions' Chesapeake Bay TMDL Watershed Implementation Plans. According to the Climate Resiliency Workgroup, the implementation of the qualitative options, as described, will require engagement with source sector experts to assess scientific understanding and the technical capacity to quantify the likely impact of climate change on BMPs (CRWG, 2016)<sup>1</sup>. The workshop results and products will help jurisdictions learn more about how to optimize their reductions from nonpoint source BMPs while increasing the resiliency of BMPs against future damages due to sea level rise, coastal storms, increased temperature, and extreme events.

### **Detailed description of workshop product and identified delivery date**

The primary products will be a two-day workshop and an associated final workshop report. Draft workshop deliverables will be prepared by the steering committee for review and comment by workshop participants within 60 days of the final workgroup session and a final workshop report will be completed within 90 days of the final session. It is anticipated that the final report will include summary of latest scientific understanding, recommended performance measurements, preliminary BMP siting and design guidance; and recommendations for future research and technical information needs to support procedures (e.g., monitoring and local feedback on performance) that could be used or put into place to inform future targeting of BMPs and to gather new information that could improve BMP and WIP planning, development, and implementation.

### **Anticipated Attendees**

Workshop attendees will include steering committee members in addition to experts in climate change and will include watershed and Bay scientists, CBP Water Quality Goal Implementation Team and Workgroup representatives, including the Climate Resiliency, Urban Stormwater, Agriculture and Stream Health Workgroups, as well as managers at the State, Federal, and municipal level. The workshop will be invite only and limited to no more than 40 participants.

### **Anticipated Speakers**

Jordan Fishback, Rand Corp.  
Jonathan Butcher, Tetra Tech  
Bobby Tucker, Tetra Tech  
Hamid Karimi, District Department of the Environment  
Kevin Smith, Maryland Dept. of Natural Resources  
USDA Climate Hub Researcher  
Additional Speakers, TBD

### **Logistics**

The two-day workshop will be conducted in the Fall of 2017. Workshop participation will be invitation only, with a limit of 40 participants. A portion of the budget will be dedicated to cover travel expenses for key participants. The location of the one-day workshop sessions will be in proximity to Annapolis, MD.

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<sup>1</sup> CBP Climate Resiliency Workgroup. 2016. [Guiding Principles and Options for Addressing Climate Change Considerations in the Jurisdictions' Phase III Watershed Implementation Plans](#) . Chesapeake Bay Program Partnership, Annapolis, MD.

**Budget** - Venue: \$3,000; Catering: \$2,000; Travel for invited participants: \$2,500. The [Mid-Atlantic Regional Integrated Sciences and Assessments \(MARISA\) Program](#) has committed funds in the amount of \$1,500 in support of the workshop.

**Total Requested from STAC: \$6,000**

**History of previous STAC-funded Climate Resiliency Workgroup workshops**

- The Development of Standardized Climate Projections for Use in Chesapeake Bay Program Assessments (March 2016)
- An Analytical Framework for Aligning Chesapeake Bay Program (CBP) Monitoring Efforts to Support Climate Change Impact and Trend Analyses and Adaptive Management (Spring 2017)



January 31, 2017

Dear STAC Leadership,

The SHWG believes that the outcomes from the Climate Resiliency Workgroup workshop proposal will be valuable for persons involved in managing and/or restoring vital Chesapeake Bay ecosystems. Specifically, for the SHWG, the workshop outcomes will help our group in addressing two action items within our bi-annual work plan. These two action items involve incorporating physical habitat functions in the verification of BMPs and as a target for TMDL improvements. The potential workshop outcomes of BMP structural integrity and design, planning and implementation guidelines may assist us in determining potentially critical physical habitat functions that we should consider when making our action plan recommendations.

I will also mention that your workshop proposal aligns well with the Sustainable Fisheries Goal Implementation Team (SFGIT) and Vital Habitats Goal Implementation Team (HGIT) workshop proposal outcomes. The SFGIT and HGIT is proposing to identify critical fish habitats and factors that influence fish habitats. They specifically identify climate change as one the potential critical factors influencing fish habitat.

Mike Lovegreen and myself are looking forward to the workshop outcomes and would like to attend the workshop.

Sincerely,

Rich Starr  
Ecosystem Planning & Restoration  
Co-Chair, Stream Health Work Group  
Habitat Goal Implementation Team

Final Proposal 02.22.17

From: **Davis-Martin, James (DEQ)** <[James.Davis-Martin@deq.virginia.gov](mailto:James.Davis-Martin@deq.virginia.gov)>  
Date: Thu, Feb 16, 2017 at 4:25 PM  
Subject: WQGIT Endorsement of STAC Workshop Proposals  
To: Lisa Wainger <[wainger@umces.edu](mailto:wainger@umces.edu)>, Rachel Dixon <[dixonr@chesapeake.org](mailto:dixonr@chesapeake.org)>  
Cc: Zoe Johnson - NOAA Federal <[zoe.johnson@noaa.gov](mailto:zoe.johnson@noaa.gov)>, "Keisman, Jennifer" <[jkeisman@usgs.gov](mailto:jkeisman@usgs.gov)>, "Power, Lucinda" <[power.lucinda@epa.gov](mailto:power.lucinda@epa.gov)>, "Gordon, Lindsey" <[Gordon.Lindsey@epa.gov](mailto:Gordon.Lindsey@epa.gov)>

The WQGIT unanimously endorses the STAC workshop proposal entitled ‘Integrating Science on Watershed and Estuarine Change: Support for the Mid-Point Assessment and Beyond’.

The WQGIT was also briefed on the STAC workshop proposal entitled ‘Assessing Impacts of Changes in Weather Patterns and Extreme Events on BMP Siting and Design’, and while support was not unanimous for the project, the majority of the WQGIT membership did support the proposal.

We look forward to these workshops.

James Davis-Martin  
Chair, Water Quality Goal Implementation Team  
Chesapeake Bay Program  
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