

**Rising Watershed and Bay Water Temperatures—Ecological Implications and Management
Responses: A Proactive Programmatic CBP STAC Workshop Proposal
February 9, 2021**

Submitted By

- Water Quality Goal Implementation Team and its Forestry and Urban Stormwater Workgroups
- Habitat Restoration Goal Implementation Team and its Stream Health, Wetlands and SAV Workgroups and Brook Trout Action Team
- Maintain Healthy Watersheds Goal Implementation Team
- Sustainable Fisheries Goal Implementation Team
- Scientific, Technical Assessment and Reporting Team and its Climate Resiliency and Status and Trends Workgroups
- Citizens Advisory Committee

Workshop Steering Committee Members

1. Rebecca Hanmer, Co-Chair; U.S. EPA Retired; Chair, CBP Forestry Workgroup
2. Bill Dennison, Co-Chair; UMCES; Member, CBP STAC; and Co-Chair, CBP STAR Team
3. Matthew Ehrhart, Stroud Water Research Center; Member, CBP Citizens Advisory Committee
4. Julie Reichert-Nguyen, NOAA CBO; Coordinator, CBP Climate Resiliency Workgroup
5. Bruce Vogt, NOAA CBO; Coordinator, CBP Sustainable Fisheries Goal Implementation Team
6. Expert with habitat, wetlands, or watershed expertise (TNC or other NGO)
7. Expert with freshwater fisheries or watershed expertise
8. Katherine Brownson, U.S. Forest Service
9. Scott Phillips, USGS; Co-Chair, CBP Scientific, Technical Assessment and Reporting Team
10. Rich Batiuk, U.S. EPA Retired; CoastWise Partners

Workshop Objectives

Water temperature increases are occurring in Chesapeake Bay tidal waters and in streams and rivers across the Bay's watershed, and are expected to continue. Water temperature increases have significant ecological implications for Bay and watershed natural resources, and could undermine progress toward Chesapeake Bay Program (CBP) Partnership goals for fisheries management, habitat restoration, water quality improvements, and protecting healthy watersheds. There is a critical need for insights into what the CBP Partnership might do now—within the scope of its current goals, policies and programs—to actively prevent, mitigate or adapt to some of the adverse consequences. This STAC workshop is proposed to meet these needs through these primary objectives:

- Summarize major findings on the ecological impacts of rising water temperatures, including science-based linkages between causes and effects; and
- Develop recommendations on how to mitigate these impacts through existing management instruments, ranging from developing indicators, identifying best management practices, and adapting policies.

Management Relevance and Targeted Management Outcomes

The impact of climate change on the restoration and protection of Chesapeake Bay and its watershed is being monitored, modeled and studied, and much new knowledge is being gained. This workshop will take advantage of available knowledge to determine how to better direct or redirect five of the Chesapeake Bay Program Partnership's major management instruments to help to prevent, mitigate or adapt to harmful effects from water temperature increases. These management instruments are: (1) development, public reporting and management application of a **Chesapeake Bay water temperature change indicator**; (2) identification of and better quantification of the benefits from **temperature-lowering best management practices (BMPs)** for targeted implementation in the states' **Phase III Watershed Implementation Plans (WIPs)**; (3) changes to **habitat restoration strategies** to prevent,

mitigate or adapt to rising water temperatures; (4) adaptation of Partnership and states to proactively respond to **fisheries** impacts associated with projected increases in watershed and Bay tidal water temperatures; and (5) enhancing the **Partnership's Healthy Watersheds Assessment** to factor in whether watersheds may be more vulnerable or resilient to stream temperature changes in the absence of certain key landscape factors.

Why a STAC Workshop and the Urgency

Previous STAC sponsored and other scientific efforts have documented that water temperatures are rising, and discussed their potential effects on the Bay and its watershed. For nearly four decades, the CBP Partnership has largely based its restoration and protection goals and decisions on assumptions of constant air and water temperature regimes. Further, the Partnership has focused on nitrogen, phosphorus and sediment pollutant load reductions as the means to restore water quality and aquatic ecological integrity, with limited consideration of temperature. Recently, the Partnership has placed emphasis on possible impacts of climate-related changes, such as how BMPs might function in light of changing precipitation patterns, but not increasing water temperatures. So there is a critical need for a STAC workshop on better understanding the potential effects of rising water temperatures, and developing options to mitigate these effects.

A STAC workshop provides the ideal forum for: (1) updating information on the potential effects of rising temperatures; (2) improving understanding of the science-based linkages between causes and effects; and (3) using the enhanced scientific and technical foundations for recommending changes in Partnership priorities, policies, and management decision support systems and tools. The findings and recommendations from a STAC workshop provide needed credibility for the Partnership to fully factor increasing water temperatures into its decision-making for achieving the Partnership's shared fisheries, habitat, water quality and healthy watersheds goals. To influence the states' implementation of the Phase III WIPs through 2025, stronger linkages between rising water temperatures and decisions about placement of BMPs must be forged now to change decision-making in 2023-2025 and beyond.

Workshop Preparation and Planning

We propose addressing the workshop outcomes in three sequential phases, leading to production of a final workshop report with recommendations in STAC's requested 'SPURR' format.

Phase 1 This workshop preparation phase will begin with in-depth compilations of the CBP partners' and stakeholders' current understanding about Bay watershed and tidal water temperature increases, their ecological implications, any recognized temperature change thresholds, and current understanding of actions being taken to actively prevent, mitigate or adapt to rising water temperatures. The workshop's sponsoring committees, goal implementation teams, and workgroups will also be challenged to initiate work on identifying a range of possible actionable recommendations to be considered and discussed at the workshops. A series of short pre-workshop summary presentations will be prepared by subject matter experts and posted as YouTube videos addressing background themes focused on the five management instruments. Workshop participants will be asked to watch the YouTube presentations prior to the workshop to significantly reduce the meeting time devoted to background presentations.

Phase 2 The first workshop will be a one full-day meeting. Concurrent tracks will address the ecological impacts and management implications of rising water temperatures on the watershed and tidal waters, respectively. This first workshop will focus on building a more complete picture of interrelationships between the causes of increasing water temperature, the resultant ecological impacts, the range of management implications, and the relative scales of these cause and effects.

Phase 3 The third phase will start with the Steering Committee working from a synthesis of the first workshop to refine findings on the interrelationships and develop recommendations for more effective use of the Partnership's management instruments. The second workshop, one full-day, will focus on in-depth discussions to build consensus on the first workshop's findings and the action recommendations. Having the synthesis of the first workshop already in hand will help ensure the final workshop report is completed by the Steering Committee within 90 days of the second workshop.

Questions to Answer

- What type of indicators and data considerations—spatial (e.g., location in the water column) and temporal (e.g., seasonal versus annual)—are needed to assess watershed and tidal Bay water temperature change that will be useful in informing fisheries management and habitat restoration decisions?
- How could available monitoring and modeling data be used to develop such indicators and what are the data and information gaps?
- What characteristics of BMPs will likely help in mitigating (or conversely, exacerbate) rising water temperatures?
- How should priorities for BMP implementation be changed based on increasing water temperature considerations?
- What watershed and Bay species and habitats are most likely to be endangered by climate-induced water temperature changes?
- What modifications in habitat restoration and fisheries management programs seem necessary in light of current and projected watershed and Bay water temperature increases?
- What are the characteristics that make healthy watersheds either more vulnerable or more resilient to increasing water temperatures?

Expected Outcomes

The end-product of this three-phased approach will provide: (1) recommendations for specific management actions tailored to the Partnership's Sustainable Fisheries, Habitat, Water Quality, and Healthy Watersheds Goal Implementation Teams and their workgroups, the Scientific, Technical Assessment and Report Team and its workgroups, the Scientific and Technical Advisory Committee, and, ultimately, the Management Board, Principals' Staff Committee and the jurisdictions; (2) specific recommendations for more rigorous scientific applications to better understand the impacts of elevated water temperature and further develop management actions in the future which can be taken to prevent, mitigate or adapt to its ecological consequences; and 3) an appendix to the final workshop report presenting the synthesis of the information compiled during preparation for the workshops.

Logistics

We propose to conduct the first workshop in January 2022 to allow time to conduct the necessary pre-workshop compilation and synthesis. To enable the Steering Committee to carry out its consideration of the outcomes from the first workshop, the second workshop will be scheduled in April 2022.

Budget

The total cost is projected to be \$10,000. The components are venue: \$1500; food: \$2,500; travel/lodging for selected participants: \$3,000; and contractual assistance with pre-workshop compilation and synthesis of existing scientific findings, technical data and supporting information: \$3,000.

**Rising Watershed and Bay Water Temperatures—Ecological Implications and Management Responses:
A Proactive Programmatic CBP STAC Workshop Proposal
- Virtual Workshop Option –**

Introduction: The STAC Workshop Proposal is based on a three-phased approach, with two one-day in-person workshops in early 2022 separated by a Steering Committee preparation period. The multi-GIT project team who developed the proposal strongly recommends in-person meetings, with their valuable synergy, based on experience of successful STAC workshops.

The option of using virtual technology for one or both of the workshops has not been discussed in depth by the project team. Thus, what follows are preliminary thoughts about how Zoom meetings might work, if required for one or both of the one-day workshops.

Phase 1 - Workshop Preparation. Virtual meetings and presentations are already built into this phase. All cooperating workgroups will compile and synthesize CBP and stakeholders' current understanding of the subject, in their respective areas. A virtual cross-GIT meeting will be held (tent. June 2021, hosted by the Climate Resiliency Workgroup) to review progress. Under Steering Committee direction, a series of short videos will be prepared by subject matter experts, and posted prior to the first workshop to inform participants. This will reduce the time needed for background presentations in the workshop itself.

Phase 2 - First One-Day Workshop. Two concurrent meetings discuss ecological impacts and management implications of rising water temperatures on the watershed and tidal waters. During Phase 1, the Steering Committee will decide if a one-hour Zoom plenary briefing session is required, or whether the concurrent Zoom meetings will be separate from the start. Advance briefing materials will focus participants on interrelationships between the causes of increasing water temperatures, ecological impacts, range of management implications and relative scales of causes and effects. Steering Committee and supporting project team members, who have experience in moderating scientific sessions, will serve as the discussion leaders. The Steering Committee will identify creative ways to engage with workshop participants. Meeting on Zoom will allow additional scientific experts from outside the region to be invited.

Phase 3 - Synthesis of Workshop 1 and Second One-Day Workshop. The Steering Committee will work from a synthesis of Workshop 1 to refine findings on interrelationships and develop draft action recommendations. The second workshop is where an in-person meeting has special advantages—both in terms of discussion synergy and opportunities for continuing interaction during breaks and lunch. A second Zoom workshop will require more advance interaction of Steering Committee members with participants. Steering Committee and project team experts will lead discussions in the two concurrent sessions. After the watershed and tidal water expert groups meet separately, a concluding two-hour Zoom plenary session is led by the Steering Committee co-chair. Each group presents its findings and action recommendations for discussion and agreement.

February 9, 2021

Chesapeake Bay Program Scientific and
Technical Advisory Committee
c/o Chesapeake Research Consortium
645 Contees Wharf Road
Edgewater, Maryland 21037



Dear STAC Leaders, Members and Staff:

On behalf of the Water Quality Goal Implementation Team and each of our respective supporting partners, we are documenting our strong support and advance commitment of our respective staff resources for the proposed Science and Technical Advisory Committee (STAC) workshop titled “Rising Watershed and Bay Water Temperatures—Ecological Implications and Management Responses: A Proactive Programmatic CBP STAC Workshop Proposal.” Our partners are the Citizens Advisory Committee; the Sustainable Fisheries, Habitat Restoration and Maintain Healthy Watersheds Goal Implementation Teams; the Scientific, Technical Assessment and Reporting Team and the Climate Resiliency Workgroup.

Water temperature increases are occurring in Chesapeake Bay tidal waters and in streams and rivers across the Bay’s watershed. There is every reason to believe that temperatures will continue to rise over time. Water temperature increases have significant ecological implications for Bay and watershed natural resources, and could undermine the significant investments to date in Bay and watershed living resource management, habitat restoration and water quality improvements. There are things which the Chesapeake Bay Program partnership might do now—within the scope of its current goals, policies and programs—to actively prevent, mitigate or adapt to some of the adverse consequences.

It is our collective intent to use this two-part workshop series, and the advance compilation and synthesis of existing information, to build consensus within our partnership to elevate the attention given to and the focus on rising watershed and Bay water temperatures across all our shared goals. The level of support and engagement across multiple goal implementation teams and the Citizens Advisory Committee for the STAC-sponsored workshop proposal is exceptional and demonstrates the cross-cutting nature of the scientific and management challenges we are facing.

The timing and urgency for this workshop and the follow-through on the resulting management action recommendations is driven, in part, by the window of opportunity to influence the on-going implementation of the watershed jurisdictions’ Phase III Watershed Implementation Plans. We are fast approaching our shared goal for full WIP implementation by 2025. We must act now to apply our collective understanding of the practices for reducing and

preventing nutrient and sediment pollutant loads from entering our waterways which will also contribute to mitigating rising water temperatures.

Our sense of urgency is also driven by the need to ensure that our individual and collective living resource management decisions are informed by and respond to the growing understanding of how rising water temperatures are influencing migration patterns, timing of spawning events and even threatening the survival of individual species and entire aquatic communities in our watersheds and Bay tidal waters. Our habitat restoration and protection strategies need to evolve. They must factor in considerations not only of current water temperatures, but also of future projections and the cascading effects of rising water temperatures—from endangering brook trout in our headwaters through survival of eelgrass in our higher saline shallow-water habitats.

Consideration of rising water temperatures, current and future, must be factored into hundreds if not thousands of individual and collective decisions we are making every year as we continue our collaborative efforts to restore and protect our surrounding watersheds and the resources within our Chesapeake Bay waters. We envision this STAC workshop as the foundation on which to build that management commitment for consideration of rising water temperatures into all of our collective decision-making processes. And we must continue to adjust and adapt our collaborative monitoring networks and shared modeling systems to our enhanced understanding of the effects of rising water temperatures.

We collectively ask for your support of this workshop and our planned advance workshop preparation to enable the Chesapeake Bay Program partnership to embrace consideration of rising water temperature in its unique collaborative decision-making processes.

On behalf of the Water Quality Goal Implementation Team and our supporting partners, please accept our proposal for a proactive programmatic STAC workshop.

Sincerely,



Ed Dunne
Co-Chair, CBP Water Quality Goal Implementation Team



James Martin
Co-Chair, CBP Water Quality Goal Implementation Team