Introducing the Project...

Rising Watershed and Bay Water Temperatures—Ecological Implications and Management Responses: A Proactive Programmatic CBP STAC Workshop

Phase 1 (2021): Information collection and synthesis

Phases 2 and 3 (early 2022): Two-part STAC Workshop recommending CBP responses

Participants:

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

Project Description prepared for the Climate Resiliency Workgroup Meeting on June 21, 2021

Introduction: Need to Focus on Rising Watershed and Bay Water Temperatures

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. Studies show that 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.

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. 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.

The CBP Partnership urgently needs a better understanding of the potential ecological effects of rising water temperatures. It needs insights on what it can do --within the scope of its current goals, policies and programs–to prevent, mitigate or adapt to some of the adverse consequences.

Workshop Objectives

A STAC workshop provides an ideal forum for improving understanding of emerging science, and using enhanced scientific and technical foundations to recommend changes in Partnership priorities, policies, management decision support systems and tools. STAC approved the Rising Water Temperatures workshop proposal in March 2021, for implementation in its upcoming fiscal year. This two-part STAC workshop, with its 2021 preparation phase, has 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.

Targeted Management Outcomes

(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.

Workshop Preparation and Planning

Phase 1 Workshop preparation began in Spring 2021 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 collected information is being synthesized, and progress reviewed during the Climate Resiliency Workgroup cross-workgroup meeting on June 21, 2021.

The workshop's sponsoring committees, goal implementation teams, and workgroups will be challenged to begin identifying a range of possible actionable recommendations to be considered and discussed at the STAC workshop. 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.

Phase 2 The first part STAC 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 day 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 day to refine findings on the interrelationships and develop recommendations for more effective use of the Partnership's management instruments. The second-part 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.

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. Renee Thompson, USGS; Coordinator, CBP Healthy Watershed Goal Implementation Team
7. Frank Borsuk, USEPA Freshwater Fisheries Biologist
8. Katherine Brownson, U.S. Forest Service
9. Scott Phillips, USGS; Co-Chair, CBP Scientific, Technical Assessment and Reporting Team
10. Rich Batiuk, USEPA Retired; CoastWise Partners

Project Team

Essential products for STAC workshop preparation are being developed by the Project Team working with the Steering Committee members. Key Project Team members include:

Stephen Faulkner, Peter Tango and Gary Shenk, USGS; Sally Claggett, USFS; Lewis Linker, Lucinda Power and Todd Lutte, EPA; Tom Schueler, CSN; Jeremy Hanson, VT; Anne Hairston-Strang, MD DNR-Forestry; Brooke Landry, MD DNR; Judy Okay, J&J Consulting, VA DOF; Mark Dubin, UMD; Nora Jackson, Breck Sullivan, Jackie Pickford and Justin Shapiro, CRC. In addition, Jonathan Leiman and Anna Kasko, MDE, are contributing information from Maryland's Temperature TMDL project.