



Chesapeake Bay Program's (CBP)
Scientific and Technical Advisory Committee (STAC)

Rising Watershed and Bay Water Temperatures—Ecological Implications and Management Responses: Day 1

January 12, 2022

[Workshop Webpage with Synthesis Reports](#)

Workshop Description: 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 first workshop day is focused on building a more complete picture of interrelationships between the causes of increasing water temperature and the resultant ecological impacts, assessing the relative certainty of the available information to support decision making, and identifying the range of management implications. This will set the stage for management recommendations, which will be the subject of a second meeting in March involving selected experts and participants in Chesapeake Bay Program activities.

Workshop Objectives: Day 1

- Build a more complete picture of the interconnections between increasing water temperature and the important drivers that result in temperature rise
- Synthesize current scientific understanding of ecological impacts of increasing water temperature, including identifying particularly vulnerable species, landscapes, and communities and the specific aspects of temperature rise with the greatest potential to adversely impact tidal and freshwater ecosystems and habitats
- Identify critical knowledge gaps to be filled
- Accounting for both the causes and effects of rising temperatures, consider a range of potential management implications

Agenda Overview

8:30 am **Full group: Welcome Plenary**—*Bill Dennison (UMCES), Julie Reichert-Nguyen (NOAA), Katie Brownson (Forest Service)*

9:15 am **Subgroup Breakouts: Watershed and Tidal—Full Agendas for subgroups below**

Participants will be divided into Watershed and Tidal subgroups

- [Watershed Subgroup Agenda](#)
- [Tidal Subgroup Agenda](#)

3:45 pm **Full group: Closing Plenary**

- **Tidal Summary**
- **Watershed Summary**

Each subgroup will summarize key points and findings. The group will discuss next-steps and preparations for Day 2 of the Workshop.

4:30 pm **Adjourn—Thank you!**

Watershed Subgroup Agenda: 9:15am-3:45pm

9:15-11:15 am Session 1: Drivers of increasing water temperature

9:15-9:45- Session introduction

- Icebreaker question: What is your biggest concern or focus with regard to rising non-tidal water temperatures?
- Introductory presentation summarizing understanding of how climate change, land use and hydrogeology influence nontidal water temperatures.
- Outline the objectives and process for the breakouts and address any clarifying questions

9:45-10:30- Breakout Sessions

- Are there any major drivers of rising water temperature missing from the conceptual model?
- For each major driver of rising water temperature, what is its relative influence over water temperature (high/medium/low), what is our certainty (high/medium/low), and what is our ability to manipulate the driver (high/medium/low)?
- How do these drivers impact water temperature (i.e. do they moderate overall temperature variability, influence average water temperatures, reduce max summer water temperatures, etc.)?
- What knowledge gaps do we still need to fill before making management recommendations?
 - Would additional or different monitoring/modeling help fill these gaps?
 - Who is missing from this conversation?

10:30-10:40- Break

10:40-11:15- Report out and synthesis of key messages

11:15- 11:45 am Session 2: Ecological impacts of increasing water temperature

Session introduction

- Mentimeter question: Which freshwater species or habitats are most vulnerable to rising water temperatures?
- Introductory presentation summarizing our understanding of the ecological impacts of increasing water temperature, including the relative vulnerability of freshwater species in the watershed.
- Outline the objectives and process for the breakouts after lunch and address any clarifying questions

11:45-12:45 Lunch (Zoom meeting will stay open- optional opportunity for informal conversation)

12:45-2:05 pm Session 2, continued: Ecological impacts of increasing water temperature

12:45-1:30- Breakout group discussions to address key questions

- Which freshwater species or habitats are most vulnerable to rising water temperatures in the Chesapeake Bay watershed? Are we focusing on the right species? Opportunity for further reflection/discussion based on the session introduction
 - For each of the focal species, provide rankings on relative exposure, sensitivity and adaptive capacity to rising water temperatures
 - Focal species:
 - Coldwater species (brook trout, brown trout, rainbow trout, checkered sculpin)
 - Warmwater fish (largemouth bass, smallmouth bass, yellow perch, white perch, white bass, bluegill)
 - Macroinvertebrates
- Which aspects of temperature rise have the greatest impact on vulnerable species or ecological communities (e.g. maximum summer water temperatures, rate of water temperature change, etc.)?
- What knowledge gaps do we still need to fill before making management recommendations?
 - Would additional or different monitoring or modeling help fill these gaps?
 - Who is missing from this conversation?
- What other stressors could interact with increasing stream temperatures to negatively impact stream health?

1:30- 2:05- Report out and synthesis of key messages

2:05-2:15 pm

Break

2:15-3:30 pm

Session 3- Management implications

2:15-2:35- Session Introduction

2:35-3:00- Ranking exercise in Mentimeter

- Looking at the key stressors and ecological impacts identified today and in the synthesis papers, are there any management approaches that could be used to reduce vulnerability that we missed?
- Which policies and practices would be most useful for reducing vulnerability in the short term? In the long term? (Pick top 3 for each)
- Which of these policies and practices have the highest certainty for success? (Pick top 3)
- Which scientific management instruments would be most useful for reducing vulnerability in the short term? In the long term? (Pick top 3 for each)
- Which of these scientific management instruments have the highest certainty for success? (Pick top 3)

3:00-3:20- Breakout group discussions to address key questions

- How should we focus the discussion about these management approaches for Day 2 of the workshop? What level of detail is needed? For example, should the focus be on types of best management practices or more general statements on types of practices and programs (such as land use controls)?

- During Day 2, what discussions are needed around prospects for better indicators, and priority monitoring, modeling and research needs to inform management recommendations?
- Any other suggestions for Workshop 2?

3:20-3:30- Report out and synthesis of key messages

3:30-3:45 pm Watershed Session Wrap-up

- What are some key takeaways from the day to bring back to the plenary session?

3:45 pm Return to main session for full group wrap-up

Tidal Subgroup Agenda: 9:15am-3:45pm

9:15-11:30 am **Session 1: Identify key factors to consider in assessing management implications related to rising water temperatures and ecological impacts**

9:15-9:45- Session Introduction—*Julie Reichert-Nguyen, NOAA*

- This session will focus on ground-truthing the effects of rising water temperatures from climate change on key fisheries (i.e., oyster, blue crab, finfish) and submerged aquatic vegetation (SAV) resources identified in synthesis papers. Participants will identify and discuss key factors that should be considered to inform management action.

9:45-10:30- Breakout Sessions

- What are the direct and indirect positive and negative effects of rising water temperatures on the fishery/SAV resource?
- Are there certain effects more concerning than others from a resource management standpoint?
- What are the key factors to consider for the fishery/SAV resource to inform management action around these effects?

10:35-10:45- Break

10:45-11:30- Breakout Report-outs and Discussion

- Were there any commonalities or points of departure across the different fisheries/SAV resources?
- Interactive activity to re-assess participants' thoughts on the importance of key factors to consider for informing the management of these resources.

11:30- 12:30 ***Lunch (Zoom meeting will stay open- optional opportunity for informal conversation)***

12:30-2:10 **Session 2: Discuss ecological sensitivities to rising water temperatures and certainty of information**

12:30-12:50- Session Introduction—*Bruce Vogt (NOAA)*

- This session will focus on ground-truthing what is known and not known about the sensitivities of fisheries/SAV resources to rising water temperatures and connections to vulnerable habitats utilized by that resource.

12:50-1:35- Breakout Sessions

- How certain is our knowledge of temperature sensitivities on the fishery/SAV resource?
- What research gaps do we still need to fill to inform management action around temperature sensitivities (e.g., establishing temperature thresholds)?
- What temperature-specific analyses would be most useful for informing management actions for the fishery/SAV resource?

1:35- 2:10- Breakout Report-outs and Discussion

- Interactive activity to gauge participants' thoughts on species/resource/habitat sensitivities to rising water temperatures and level of certainty of this

information related to managing the resource. E.g., “needs more research” or “sufficient information to inform management action now.”

- Identifying commonalities and departures around sensitivities and gaps in knowledge across the different fisheries/SAV resources.

2:10-2:20 pm

Break

2:20-3:45 pm

Session 3: Management implications

2:20-2:30- Session Introduction—*Rich Batiuk (EPA, retired)*

2:30-3:10- Breakout Sessions

- Looking at the ecological effects, key factors to consider, and sensitivities related to rising water temperatures identified today, what are the management implications for the fishery/SAV resource related to addressing vulnerabilities?
- What management actions are you taking now or planning to address Bay water temperature change to the fishery/resource?

3:10-3:45- Breakout Report-outs and Discussions

3:45 pm

Return to main session for full group wrap-up