Assessment of BMPs as heaters and coolers for local waters

Brief description the project, including key tasks

The STAC Rising Water Temperatures report identified a need to better consider the impacts of water quality BMPs on water temperature. As rising water temperatures are having negative ecological impacts on stream ecosystems and sensitive species like brook trout, it is important to better understand the temperature impacts of BMPs to inform BMP selection, particularly in sensitive coldwater watersheds. The STAC report was able to use existing research to identify some BMPs that are "heaters" and others that are "coolers", and confirmed that watershed-wide, we are implementing far more heater BMPs than cooler BMPs. However, there are several BMPs where we did not have sufficient information to draw conclusions regarding temperature implications.

This project would use an expert elicitation process to more systematically evaluate the effects of BMPs on water temperature throughout the watershed. This project would support convening an expert elicitation workshop, analyzing the data from the workshop and synthesizing findings into a communications product for managers regarding the temperature impacts of BMPs. Thes project would build on current USGS research efforts to evaluate the co-benefits of BMPs for stream health, including water temperature impacts, by improving and expanding out an expert elicitation process currently being conducted in smaller watersheds.

Targeted audience/user base

The primary audience would be managers selecting BMPs for implementation. However, the Bay Program could also use these results to consider whether there are opportunities to further incentivize the implementation of cooling BMPs through crediting or grant guidance.

GIT priorities that will be addressed through project funding and implementation

Warming water temperatures will make it more difficult to reach our 2025 TMDL water quality goals, as well as multiple Watershed Agreement outcomes. The STAC report recommends that moving beyond 2025, the Bay Program should consider how to incorporate water temperature more explicitly into the goals, outcomes and management strategies of the partnership to better achieve water quality goals. This project would fill a critical information gap, providing the WQ GIT with information needed to help managers prioritize the implementation of "cooler" BMPs. This would help ensure our water quality restoration work isn't further exacerbating the impacts of climate and land use change on aquatic ecosystems by further heating waterways, particularly in sensitive watersheds.

Identification of any cross-GIT application(s)

- Habitat GIT: By providing the information needed to improve the selection of BMPs to minimize adverse water temperature impacts, this project would benefits the brook trout and stream health outcomes
- STAR: Given the clear linkages of this project with climate change, this project would also engage the climate resiliency workgroup.

Intended results

Through the expert elicitation workshop, the project would provide a comprehensive set of information on the water temperature impacts of BMPs. The project would also result in a communications product for managers to help them better understand the water temperature and ecological implications of their BMP selection. Ultimately the project would aim to increase implementation of cooler BMPs over heater BMPs.

Projected budget

Costs would vary depending on whether funds were going into an existing cooperative agreement with USGS (who is already fully embedded in this work) or to an outside contractor (who would need to come up the learning curve). To support USGS, we estimate this would take $200-$300K. To support an outside contractor, we estimate this would take $300-$400K.

What other funding sources have been pursued for this project

N/A, this would build on prior STAC workshop and the expert elicitation is beyond capacity of what a STAC workshop budget could offer. However, the project would leverage past funding in the STAC Rising Water Temperatures workshop and current funding on related projects. USGS is currently completing a project that is evaluating statistically whether BMP implementation is leading to co-benefits for bugs and fish and in the process, are also looking at effects of BMP implementation on other in-stream metrics, including water temperature. USGS is beginning a broader project that is at the entire Chesapeake Bay watershed scale that builds on the Maryland project (completion date expected end of FY25), which we can leverage for this project.