The State of the Science and Practice of Stream Restoration in the Chesapeake: Lessons Learned to Inform Better Implementation, Assessment and Outcomes

Proposal for a STAC State of the Science Workshop

Submitted by: Stream Health Workgroup

Steering Committee Members (all have confirmed their participation):

1. Greg Noe, USGS and STAC, Co-Chair
2. Neely Law, Fairfax County and Stream Health Workgroup, Co-Chair
3. Bill Stack / Lisa Fraley-McNeal, Center for Watershed Protection
4. Joe Berg, Biohabitats
5. Sadie Drescher, Chesapeake Bay Trust
6. Solange Filoso, University of Maryland Center for Environmental Studies
7. Paul Mayer, EPA
8. Chris Ruck, Fairfax County
9. Rich Starr, Ecological Planning and Restoration
10. Scott Stranko, MD DNR

Background

Since 2010, jurisdictions throughout the Chesapeake Bay Watershed (CBW) have implemented approximately 266 miles of stream restoration with an additional 84 miles planned as reported in the Phase 3 Watershed Implementation Plans. The extent of project implementation driven by nitrogen, phosphorus and sediment (N/P/sed) load reductions required by the Chesapeake Bay TMDL will result in large-scale effects on aquatic ecosystems. Although Chesapeake Bay Program (CBP) expert panels have determined that stream restoration leads to N/P/sed load reductions to improve the health of the Chesapeake Bay, the effects on other local stream ecosystem attributes is less certain. Motivation for restoring streams also extends beyond load reductions and can include functional uplift to improve the status of aquatic biota and riparian corridor habitat as well as geomorphic stabilization to protect infrastructure. The rapid increases in stream restoration implementation throughout the CBW have led to growing concern and controversy about the effects of stream restoration on whole-ecosystem health and services. Although assessment of outcomes of stream restoration projects has been notoriously limited (Bernhardt et al. 2005), over time more studies have documented the results of stream restoration practices that allows the opportunity to summarize these new findings. The time is right to bring together the scientific and management communities to synthesize our understanding of practices, assessment approaches, and ecosystem outcomes in order to inform and improve stream restoration practices.

Workshop Objectives

The overall purpose of the workshop is to bring together a diverse cross-section of experts and stakeholders in the field of stream restoration to review and distill lessons learned from past stream corridor restoration projects to improve restoration outcomes. For the purposes of this workshop, stream restoration is broadly defined as an intervention to move a degraded ecosystem to a trajectory of recovery as informed by a reference condition considering local and global environmental change. The scope of the workshop includes the riparian area.

The workshop will be focused on three topics:

1. Identify the evolution of stream restoration goals, regulations, practices and practice implementation;
2. Present and discuss science and assessment to document holistic impacts and outcomes; and
3. Create a synthesis of the best available science, practices and monitoring to enable adaptive management.

Management Relevancy

This workshop will build upon the scientific literature, previous workshops and expert panels to synthesize current knowledge that supports adaptive management in the implementation of stream restoration projects with the goal to improve project outcomes. As part of the preparation for the workshop, we will develop a literature database of relevant publications. This database will be a shared product and be used to guide literature review and synthesis.

The proposed workshop will build upon past CBP and STAC efforts. We will use the findings of Stream Restoration crediting protocols (Urban Stormwater Workgroup, 2014-2021), as well as a prior workshop on stream restoration that identified the need to consider functional based assessments (STAC, 2015). The Stream Health Workgroup also is currently reviewing the known stressors to stream health (USGS, expected 2022).

Improved understanding of stream restoration outcomes is directly related to the goals of multiple CBP Goal Implementation Teams (GIT), Workgroups (WG), and Outcomes. The proposed workshop will primarily benefit the Stream Health WG, Forest Buffer outcome, and Urban Stormwater WG. The Stream Health Outcome is to continually improve stream health and function throughout the watershed, and their Work Plan (2022-24) includes an action to convene a STAC workshop on stream restoration. The Forest Buffer Outcome is to continually increase the capacity of forest buffers to provide water quality and habitat benefits throughout the watershed. The Urban Stormwater WG has the goal to have all practices and controls installed to achieve the Bay's dissolved oxygen, water clarity/SAV and chlorophyll *a* standards as articulated in the Chesapeake Bay TMDL document. The findings of the workshop also are relevant to the scope of the Maintain Healthy Watersheds GIT, Brook Trout Action Team, and Wetlands WG.

In addition, stakeholders throughout the Chesapeake watershed are continuing to implement large numbers of stream restoration projects. A synthesis of the state of the science and practice of stream restoration is essential to support adaptive management given the decade or more of experience with the Chesapeake Bay watershed and nationally. Through this workshop, we can reinforce communication, understanding, and development of prioritized information gaps to improve the practice of stream restoration and to suggest targeted scientific needs to support the implementation of practices that best meet stakeholder needs.

Why a STAC Workshop

There is a diverse group of stakeholders that are involved in stream restoration projects. The STAC workshop provides a unique opportunity to focus on the science and how science influences and is influenced by regulation, practice (design & engineering) policy, and programs of stream restoration. A STAC workshop is uniquely capable of recruiting and engaging across the diversity of geography, professions, institutions that are involved in stream restoration while providing a forum to collect and synthesize the best science available. In addition, a STAC workshop is extremely effective at disseminating critical findings to the CBP partnership and other organizations.

Workshop Preparation and Planning / Logistics

Phase 1: Pre-workshop Planning

Since the workshop is intended to occur in winter 2022 or early spring 2023, the Steering Committee will commence planning quickly after STAC approval. They will start with at least one planning meeting per month for the first three months and hold more frequent meetings as necessary as the workshop date gets closer. The early planning discussions among the Steering Committee will refine specific workshop questions to focus workshop content, conversations, and outcomes. A literature review will also commence. At the same time, the Steering Committee will compile a list of desired workshop presenters and participants, consisting of CBP GIT and Workgroup representatives, state and local personnel responsible for planning, overseeing, or regulating, researchers and NGOs, practitioners, and more.

Phase 2: Workshop Structure

The workshop will consist of a 2 or 2 ½ day onsite meeting (virtual if necessary). The agenda will feature particular topics and questions, as identified elsewhere in this proposal and to be further refined. The workshop will end with a working session among all attendees, guided by the Steering Committee to develop specific "SPURR" recommendations that will

inform the final report. Prior to the workshop, the steering committee will develop specific questions to tease out recommendations from the participants during the working session.

Phase 3: Workshop Follow-up

Within 90 days of the workshop, the steering committee will use the feedback and consensus on potential actions from the workshop participants to develop a set of recommendations in the "SPURR" format in the final workshop report.

Due to the technical nature of this topic, we would prefer to host this workshop in person to ease discussion and collaboration among workshop participants. We would plan for the possibility of hosting this workshop virtually if necessary, using a meeting platform provided by STAC with break-out rooms for discussion. After the completion of the final workshop report, the Steering Committee and other workshop participants will commence the writing of a scientific review paper for submission to a peer-reviewed journal.

Expected Outcomes

We envision at least five products from the workshop. First, a better engaged community of practitioners and scientists. Second, a STAC report to provide a detailed summary with actionable outcomes for the Chesapeake Bay Program and stakeholders. Third, an updated catalogue of the relevant published literature on stream restoration. Fourth, communication and presentation of findings to interested parts of the CBP. Fifth, a peer-reviewed scientific paper that synthesizes available information for a global audience.

As stream restoration is one of the most common management actions to meet the Chesapeake Bay TMDL, and streams are essential to many CBP GITs and WG, we envision the workshop will lead to better stream restoration projects through improved understanding of stream health and management – throughout the CBP, the region, and the world.

Speaker Topics/ Questions to Address

1. Opening plenary: The Chesapeake Bay Watershed history and evolution of: stream degradation patterns, trajectories, and sustainable ecosystem states (including channel evolution models), stream restoration goals, and restoration approaches. Additionally, the plenary may address questions such as, "What is the "reference" condition?", as informed by science and stakeholder input, and "What should we restore towards and repair?"
2. Goals, Resource Tradeoffs and Unintended Consequences – Describe the typical goals of stream restoration in the Chesapeake, including a comparison of goals for the managed stream reach (e.g. biotic functional uplift, and stabilization) vs downstream waters (e.g. load reduction, and attenuating peak discharge). What approaches are needed to resolve the differing goals that may conflict?
3. Regulatory/Permitting – The history and influence of the regulations and their impact on stream restoration design.
4. Restoration Outcomes and Uplift: Present and discuss the evidence of outcomes from monitoring stream restoration projects and measuring defined (or not) outcomes, including research and permits. Topics may include holistic assessment of stream ecosystem response, timescales of response, and identification of strategic knowledge gaps. How are stakeholders and researchers working together to advance adaptive management of stream restoration?
5. Stressors and Landscape/Climate Change –Are reach-scale stream restoration practices ameliorating the stressors to stream health, or do other watershed derived stressors determine stream outcomes? What factors are able to be modified to alter a stream towards recovery and what variables are outside of our control. What are the temporal and spatial scales of landscape and climate change that influence streams and stream restoration? This topic may also include the topic of larger scale restoration projects and connectivity.

Budget

For a workshop with 50 attendees, we anticipate the breakdown of costs to be: venue: $3,000 (unless we find a location to be used for free); catering: $2,000; travel/lodging for selected participants: $5,000 (total = $10,000). The actual costs will be largely dependent on whether the workshop will be in person-or virtual. If virtual, we will likely allocate the money saved to a facilitator to help us plan and implement a more effective virtual meeting.

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United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Reston, Virginia 20192

4 February 2022,

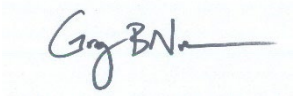
To STAC,

I am writing in support and sponsorship of our proposal for a STAC State-of-the-Science Workshop "The State of the Science and Practice of Stream Restoration in the Chesapeake: Lessons Learned to Inform Better Implementation, Assessment and Outcomes". Stream restoration is one of the most utilized best management practices used by localities to meet TMDL load reduction requirements, as well as other regulatory requirements, infrastructure protection, and functional uplift of degraded stream ecosystems. Public awareness has led to growing controversy about the effectiveness of stream restoration. Practitioners utilize a diversity of evolving approaches, while scientific assessment of outcomes have been sparse but growing. The time is right to summarize the state-of-the-science and the practice of stream restoration, to synthesize understanding to enable better adaptive management.

A STAC Workshop is uniquely needed to make progress on our topic. The stature of STAC can convince the stream restoration community to participate, knowing that the workshop will be an open, facilitated discussion that can't be missed. Given the public controversy over stream restoration, and different goals and motivations of sectors of the stream restoration community, the fairness of STAC workshopping is critical to ensure participation, engagement, openness, and accuracy. It also enables engagement with key CBP workgroups. Finally, the products of a STAC workshop are more likely to be accepted by the CBP and stakeholders.

We have a committed Steering Committee that represents the diversity of essential sectors: CBP workgroup representatives, local government, practitioners, NGOs, and government and academic scientists. All have deep experience implementing or study stream restorations, and deep and broad networks in the stream restoration community. Our knowledge and professional networking should lead to a thoughtful and all-encompassing workshop and final products. These products and their recommendations for optimizing restoration practices and prioritizing scientific needs will be invaluable to the CBP community.

Sincerely,



Gregory B. Noe, Ph.D.
Member, Science and Technical Advisory Committee of the CBP

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Chesapeake Bay Program
Science. Restoration. Partnership.

1750 Forest Drive, Suite 130, Annapolis, MD 21401

Scientific and Technical Advisory Committee (STAC)
Chesapeake Research Consortium
645 Contees Wharf Road
Edgewater, MD 21307

February 16, 2022

To the Members of STAC,

The Chairs of the Stream Health Workgroup support the proposal to implement the STAC workshop "*The State of the Science and Practice of Stream Restoration in the Chesapeake*" to discuss and disseminate findings related to the evolving practice of stream restoration, its impacts, outcomes, and management.

We believe this workshop will benefit the Chesapeake Bay Agreement's Stream Health Outcome by bringing together decades of research on stream restoration for dissemination and discussion amongst a wide range of experts. This workshop will address concerns regarding the outcomes and unintended consequences of stream restoration methodologies often used as best management practices to reduce nutrients and sediments delivered to the Chesapeake Bay. Furthermore, it will emphasize the need to recognize the health of the whole ecosystem, its functions and services, and promote holistic management of our watershed resources.

In conclusion, we would like to reiterate our full support of this grant request. It is our sincere hope that this stream restoration workshop is approved so that we may continue our work to affect overall positive change on streams in the Chesapeake Bay watershed.

Sincerely,

Alison Santoro

Alison Santoro,
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Sara Weglein

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Northern Virginia Regional Commission

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February 2, 2022

To Whom it May Concern,

I am submitting a letter of support as Chair of the Urban Stormwater Work Group (USWG) for the proposed STAC workshop, "The State of the Science and Practice of Stream Restoration in the Chesapeake: Lessons Learned to Inform Better Implementation, Assessment and Outcomes." Over the past ten years, the USWG has invested significant time and effort to define and quantify the practice of stream restoration through expert panels. The culmination of this effort has resulted in an improved understanding of stream restoration and its practice, along with documented science needs and gaps, specifically improving the overall ecological function of streams. It has also resulted in discord amongst regulators, scientists and citizens given the scientific questions that remain unanswered in whole, or in part. The proposed STAC workshop is extremely timely to address these scientific needs and knowledge gaps given the extent of implementation planned through the Chesapeake Bay watershed to meet the 2025 Chesapeake Bay TMDL nutrient and sediment goals. Additionally, stream restoration projects are engaging a more diverse and active group of stakeholders challenging or expanding upon project goals and outcomes.

This workshop is a natural and needed extension of the work completed by the USWG and will help to address the identified research needs identified in the expert panel reports. The workshop is an opportunity to collaborate with the Stream Health Work Group and provide mutually beneficially outcomes for our local, State and Federal partners.

Sincerely,

Normand Goulet

Normand Goulet
Chair, CBP Urban Stormwater Work Group
Director, Division of Environmental and Resiliency Planning
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Chesapeake Bay Program
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February 15, 2022

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

Dear STAC Leaders, Members and Staff,

I am submitting this letter of support on behalf of the Forestry Workgroup (FWG) and each of our supporting partners. This letter documents our strong support and advance commitment of our available staff resources for the proposed Scientific and Technical Advisory Committee (STAC) workshop titled: "The State of the Science and Practice of Stream Restoration in the Chesapeake: Lessons Learned to Inform Better Implementation, Assessment and Outcomes."

The Forest Buffer Outcome in the Chesapeake Bay Agreement states: "Continually increase the capacity of forest buffers to provide water quality and habitat benefits throughout the watershed. Restore 900 miles per year of riparian forest buffer and conserve existing buffers until at least 70 percent of riparian areas through the watershed are forested."

Decades of research cite the inextricable link between the health of streams and forested riparian areas. With the growing interest and implementation of stream restoration practices in the watershed, there is concern about the implications of these practices to protecting existing forest buffers. The FWG received funding from the Goal Implementation Team funds in 2020 to evaluate the impact of stream restoration on existing forest buffers and address this concern.

This proposed workshop is a natural and needed extension of the work completed and underway by the FWG to address riparian buffers and stream restoration. The workshop and its outcome will facilitate needed collaboration amongst the Chesapeake Bay Agreement outcomes, enabling all stakeholders to achieve their goals.

We appreciate your consideration of our views.

Sincerely,

Rebecca Hanmer

Chair, CBP Forestry Workgroup