Maintaining Forests in Stream Corridor Restoration

State Webcasts

Introduction and Purpose

With growing interest and implementation of stream restoration in the Chesapeake Bay Watershed, there is an increasing need for research about how to protect riparian buffers and minimize their impact during stream restoration construction. The Center for Watershed Protection (CWP) conducted three half-day state-focused webcasts (one each in PA, MD, and VA) to support the project "Maintaining Forests in Stream Corridor Restoration and Sharing Lessons Learned," a collaborative effort with the Chesapeake Bay Program (CBP) and stakeholders to evaluate impacts of stream restoration projects on existing riparian ecology and forest buffers in Pennsylvania, Maryland, and Virginia. The webcasts were intended for Bay partners, stream restoration practitioners, and local officials involved with stream restoration at the state and local level.

The purpose of the webcasts was to present the current project findings and discuss how to improve stream restoration practices to minimize impacts to habitat and maximize water quality benefits. In addition, representatives from state agencies, local governments, and practitioners provided their perspectives on how riparian vegetation, including forest buffers, are considered as part of stream restoration projects.

The agenda for each webcast was similar, with the state agency, local government, and practitioner presentations focused on the state in which each webcast was held and included the following:

- Welcome and Project Overview
- State Agency, Local Government, and Practitioner Presentations
- Presentation of Project Results
- Facilitated Discussion
- Wrap Up and Next Steps

Discussion and lessons learned from the webcasts will be used in the development of guidance for local governments on the best practices to minimize unintended adverse outcomes to riparian forests and help improve selection, permitting, and funding processes for stream restoration projects in the Chesapeake Bay watershed.

Webcast Planning

Webcasts were planned in coordination with the project's Stakeholder Team, who provided input on potential speakers, attendees, and discussion topics. Speakers that provided state agency perspectives included members from the Stakeholder Team that represented the PA Department of Environmental Protection (PA DEP), MD Department of the Environment (MDE), and VA Department of Environmental Quality (VA DEQ). Local government speakers represented the County in each

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state that was selected as a focal area for the project's recently completed case study analysis and included Lancaster County, PA, Anne Arundel County, MD, and Fairfax County, VA. These three counties were identified to represent each of the three states, and a variety of physiographic regions and stream restoration design types. The counties were selected based on the availability of stream restoration projects, feedback from a Stakeholder Team survey, and available monitoring data. Speakers providing the practitioner perspective were those identified as that have implemented multiple stream restoration projects within the focus state of each webcast.

Webcasts

Links to the information for each state webcast are provided in Table 1. The webcast recording links are for the Zoom recordings of each webcast[1]. The summary links go the webcast summaries within this document, which include information on the agenda, speakers, and meeting minutes.

Table 1. Webcasts

State	Webcast Date/Time	Webcast Recording Link	Webcast Summary Link
Pennsylvania	May 18, 2022 9 AM – 12 PM	PA Webcast Recording	PA Webcast Summary
Maryland	May 20, 2022 1 PM – 4 PM	MD Webcast Recording	MD Webcast Summary
Virginia	May 18, 2022 1 PM – 4 PM	VA Webcast Recording	VA Webcast Summary

Key Discussions and Lessons Learned

The key discussion and lessons learned from the state webcasts are summarized below.

Defining Stream Restoration and Appropriate Restoration Targets

The definition of restoration varies among the states and consistent terminology is important for processing permits. For PA DEP, restoration addresses the underlying causes of resource degradation within the modern constraints and acceptable vegetative outcomes are driven by addressing the underlying cause of degradation. Targeting symptoms of degradation would not be considered restoration under this definition. MD DNR adopted guiding principles related to stream restoration in June 2015 that defines and reviews distinct criteria for various types of stream treatments (e.g., restoration, rehabilitation, engineering, reclamation, stabilization, and enhancement) and noted that not all projects should be considered stream restoration. Historic or predevelopment conditions for setting vegetation restoration goals do not play a major part in MDE's considerations, which instead evaluates projects based on the value of current conditions. In VA, the definition of stream restoration is the process of converting an unstable, altered, or degraded stream corridor, including adjacent areas and floodplains to its natural conditions.

Community Engagement

Landowner engagement and public outreach/education are essential components of stream restoration projects and should be done early in the project process prior to the submission of permit applications to the state. Many community concerns are related to tree loss and Impacts to the terrestrial system in public areas where larger floodplain reconnection projects are proposed. It's

[1] A transcript of the webcast is included with the recording, but please note that the transcript has not been edited for grammatical correctness.

important to understand what the public wants and then balance whether that is appropriate for the site or not within the regulatory requirements. It's also important that the community be involved in reviewing project documents and assisting with decision making.

Monitoring and Maintenance

Monitoring and maintenance were noted as a critical components of stream restoration projects that are often overlooked. Incorporating maintenance into the project design and having it contracted is encouraged because landowners are unlikely to conduct maintenance themselves. One of the challenges identified was a lack of trained professionals that can conduct community classification and condition assessments. Performance-based contracting and warranty monitoring for plant survival and contractual requirements were noted as options to increase successful projects. An additional recommendation was that municipalities set aside 10% of project costs for monitoring and maintenance post-construction.

Another difficulty with maintenance and monitoring programs is not having an agreed upon functional metric to define a healthy forest. Developing regionally specific riparian monitoring protocols and forest quality indices was suggested. With advances in technology, remote-sensing tools are also useful for broad scale monitoring to supplement on-the-ground investigations.

Stream restoration projects can open space for invasive encroachment, with invasive species growth common in the first 2 years post-construction. Development of invasive species control plans using appropriate methods are an important part of maintenance (hand pulling or cutting, mechanical controls, prescribed fire, grazing/goats, and/or chemical applications). Forest mitigation plans often required of stream restoration projects can eliminate invasives and plant native vegetation improving the ecological health of the riparian area.

Effects on Stream Temperature

Increased stream temperature is also a concern because forest cover is important for cold water refugia. There is currently a STAC report under development on this topic. One problem is that many stream systems are driven by stormwater with limited groundwater-based flow. Microtopography is an important consideration and several speakers noted that substantial groundwater connection is a driver of cooler stream temperature. This is inconsistent with findings from the STAC report but is dependent on multiple factors and can be a complicated modeling problem that requires further investigation.

Consideration of Upland Stormwater Controls

There are many older developed areas that have minimal or no stormwater management. We are looking back at the last 50 years with hindsight and still catching up. Upland stormwater controls were questioned as a potential alternative option to conducting stream restoration projects that hasn't been properly explored. The difficulty with this approach alone is that that even if the stormwater flows are reduced, degradation to the stream systems has already occurred and will continue. While the retrofit of existing facilities can be beneficial, the area benefitted is often small and localized. Implementing enough stormwater controls at the watershed scale to be effective is challenging and depending on the watershed may not be feasible due to property ownership and enforcement concerns. A comprehensive review of the scientific and gray literature on this subject was recommended.

Summary of Webcast Evaluations

Attendees were asked to complete a survey to provide feedback after each webcast. A total of 13 responses were provided. Overall, the webcast was well-received by attendees, with all survey respondents indicating they were satisfied or very satisfied with the webcast. Most of the attendees rated the material covered in the webcasts as good or excellent and appreciated that there was ample time during the discussion to bring up individual perspectives and ideas. One recommendation for improvement was to include non-governmental organizations, landowner, and concerned citizens groups in the presentations. An additional recommendation was to include more discussion of a holistic approach that includes upland treatments before stream restoration and what can be done in more urban settings.

The webcast survey report is included at the end of this document and can also be accessed by the link below.
Webcast Survey Report

PA Webcast Summary

State Webcast Information

Pennsylvania

May 18th, 2022

Agenda

Date/Time	Wednesday, May 18, 2022, 9:00 AM – 12:00 PM	
Webcast Recording Link	https://us06web.zoom.us/rec/share/eGZW2snheEGyA4eue5MKnR-MW2xgYAqa2kblUPD3gl5Pl3T8_301raTccAfJQRWw.9FZcYmKGp5KMf7te	
Link to PDF of slides	https://www.cwp.org/wp-content/uploads/2022/05/Maintaining-Forests-Webcast-Presentation-Pennsylvania-final.pdf	
Time	**Agenda Item**	**Presenter**
9:00 AM – 9:20 AM	Welcome and Project Overview	Lisa Fraley-McNeal, CWP
9:20 AM – 10:20 AM	State Agency, Local Gov, and Practitioner presentations	Dave Goerman, PA DEP
		Charity Burkhart, David Miller/Associates
		Mike LaSala, LandStudies
10:20 AM – 10:25 AM	Break	
10:25 AM – 11:05 AM	Presentation of Maintaining Forests Project Results	Lisa Fraley-McNeal, CWP
		Chris Swann, CWP
		Alexandria Wilkins, CWP
11:05 AM – 11:10 AM	Break	
11:10 AM – 11:50 AM	Facilitated Discussion	Lisa Fraley-McNeal, CWP
11:50 AM – 12:00 PM	Wrap up and Next Steps	Lisa Fraley-McNeal, CWP

Presenters

Presenter	Biography
	**Dave Goerman, Pennsylvania Department of Environment Protection** David Goerman is a Water Program Specialist at the PA Department of Environmental Protection in the Division of Wetlands, Encroachment and Training, Bureau of Waterways Engineering and Wetlands. He's responsible for providing permitting and technical expertise on a wide range of issues involving waterways, wetlands, floodplains and stormwater management. His most recent worked has focused on aquatic resource headwater research, restoration and compensatory mitigation banking. David has worked in the Division since 1993 and has a B.S. Degree in the Biological Sciences from Clarion University, Clarion, PA.
	**Charity Burkhart, David Miller/Associates** Charity Burkhart is a 2009 graduate of Penn State University and is a Registered Landscape Architect with David Miller Associates, Inc., located in Lancaster Pennsylvania. She is the MS4 Program Manager for the 6 municipalities that the DM/A Municipal Group represents, assisting those municipalities in all aspects of permit management and project design. She is a member of the Lititz Borough Zoning Hearing Board and the Lititz Borough Parks Committee, as well as the St. John Neumann Catholic School

Presenter	Biography
	PTO. Charity also enjoys spending time with her family (Scott, Eva, Olivia, Carter, Linnea, and Daniel) at their beach house near Cape May, NJ.
	**Mike LaSala, LandStudies** Michael LaSala is a Specialist and Analyst who handles multi-disciplinary and special projects generally involved with implementation of Economic Ecology concepts. He develops and manages Stormwater Management Programs (SWMPs) required for NPDES Permit compliance. He has assisted in the Countywide Action Plan (CAP) development and implementation for multiple counties as part of the Pennsylvania Chesapeake Bay Phase III Watershed Implementation Plan. He provides assistance, primarily for MS4 Permits and watershed health, to LandStudies clients across the mid-Atlantic region. Additionally, he provides unique experience in municipal operations, including intergovernmental cooperation, integrated planning, ordinance development, and utility fee development through his time as the Executive Director of the Lancaster Inter-Municipal Committee (LIMC).
	**Lisa Fraley-McNeal, Center for Watershed Protection, Inc.** Lisa is a Sr. Watershed & Stormwater Research Specialist for the Center. Lisa has been working on urban watershed and stormwater management since 2006. Her areas of expertise include GIS and field methods for watershed assessment, watershed planning, stream restoration, Chesapeake Bay TMDL crediting, and applied research on topics related to watersheds and stormwater. She has a B.S. degree in Geography and Environmental Systems, with a writing minor and cartography certificate from the University of Maryland, Baltimore County. Lisa also has a M.S. degree from the University of Maryland, Baltimore County in Marine and Estuarine Environmental Science.
	**Chris Swann, Center for Watershed Protection, Inc.** Chris is a Watershed Planner & Environmental Analyst for the Center. Chris has been a watershed planner at the Center since 1997. His work time is split between two responsibilities; researching and writing technical guidance on watershed management issues and trying to keep the Center's technology in check and functioning properly. Since joining the Center, Chris has contributed in the writing of numerous Center publications, including the Urban Subwatershed Restoration Manual series and the Better Site Design Manual. Chris has a B.S. in Natural Resources Management from the University of Maryland, as well as a B.S. in Biology from James Madison University.
	**Alexandria Wilkins, Center for Watershed Protection, Inc.** Alexandria is a Watershed planner for the Center. A recent graduate with a Master of Environmental Science and Management (MESM) degree – specializing in water resource management – and a background in environmental stewardship and education, Alexandria contributes her knowledge and experience to support the Center's mission to protect and restore water resources. She brings skills in project management, geographic information systems (GIS), and data analysis to the team. In addition, she is interested in stakeholder engagement and the collaborative management of natural resources.

Registrants

Webcast Attendance Total Number of Registrants: 24 Total Number of Webcast Attendees: 17		
Name	**Email Address**	**Webcast Attendance**
Alexandria Wilkins	ajw@cwp.org	**Y**
Alison Herman	aherman@lyco.org	**Y**
Charity Burkhart	cburkhart@dmai.com	**Y**
Charles Smith	Charles.Smith@fairfaxcounty.gov	**Y**
Chris Swann	cps@cwp.org	**Y**
Dave Goerman	dgoerman@pa.gov	**Y**
Helen Golimowski	helen@devereuxconsulting.com	**N**
Jamie Eberl	jeberl@pa.gov	**Y**
Jason Swartz	jzs7093@psu.edu	**N**
Jordan Fox	jf@cwp.org	**Y**
Katie Brownson	katherine.brownson@usda.gov	**Y**
Kristen Wolf	kwolf@pa.gov	**N**
Lisa Beatty	elbeatty@pa.gov	**N**
Lisa Fraley-McNeal	lfm@cwp.org	**Y**
Liz Feinberg	liz.feinberg63@gmail.com	**Y**
Mary Kate Gallagher	marykate.gallagher@lccd.org	**Y**
Matt English	matthew.english@dc.gov	**Y**
Mike LaSala	mike@landstudies.com	**Y**
Rebecca Lauver	rlauver@allianceforthebay.org	**N**
Rebecca Napier	rnapier@wetlands.com	**Y**
Ruth Cassilly	rcassilly@chesapeakebay.net	**N**
Sally Claggett	sally.claggett@usda.gov	**Y**
Steve Putt	stputt@pa.gov	**N**
Suzanne Trevena	trevena.suzanne@epa.gov	**Y**

Summary of Key Discussion Points

One of the key regulations in Pennsylvania is 25 Pa. Code § 105.15. Environmental Assessment, which requires the cause of degradation to be identified. An acceptable vegetative outcome is driven by addressing the underlying cause of degradation. Restoration definitions are challenging, and PA DEP is hoping to standardize the terminology because it can affect how the department processes permits. For PA DEP, restoration addresses the underlying causes of resource degradation within the modern constraints. Targeting symptoms of degradation would not be considered restoration under this definition.

Project locations are identified based on input from 1) industry professionals and interested individuals, 2) indirect individuals and entities, and 3) the public. Understanding the public's perception about a project location and desires for that location is important. Insights from the public must be balanced with what techniques are appropriate to address the underlying causes of degradation at the site within the applicable regulatory requirements.

Maintenance was agreed upon as a critical component of stream restoration projects. Incorporating maintenance into the project design and hiring a contractor to conduct that maintenance is

encouraged since landowners are typically unlikely to conduct maintenance themselves. Municipalities that David Miller/Associates Group represents are typically taking on maintenance responsibilities for a period of 3 to 5 years when property owners contribute land for a restoration project.

Additionally, non-native invasives are a concern with stream restoration projects in Pennsylvania. PA DEP has noted that sites are full of invasives at first, but once plantings are established and invasive treatments are implemented, issues with invasive vegetation are typically resolved.

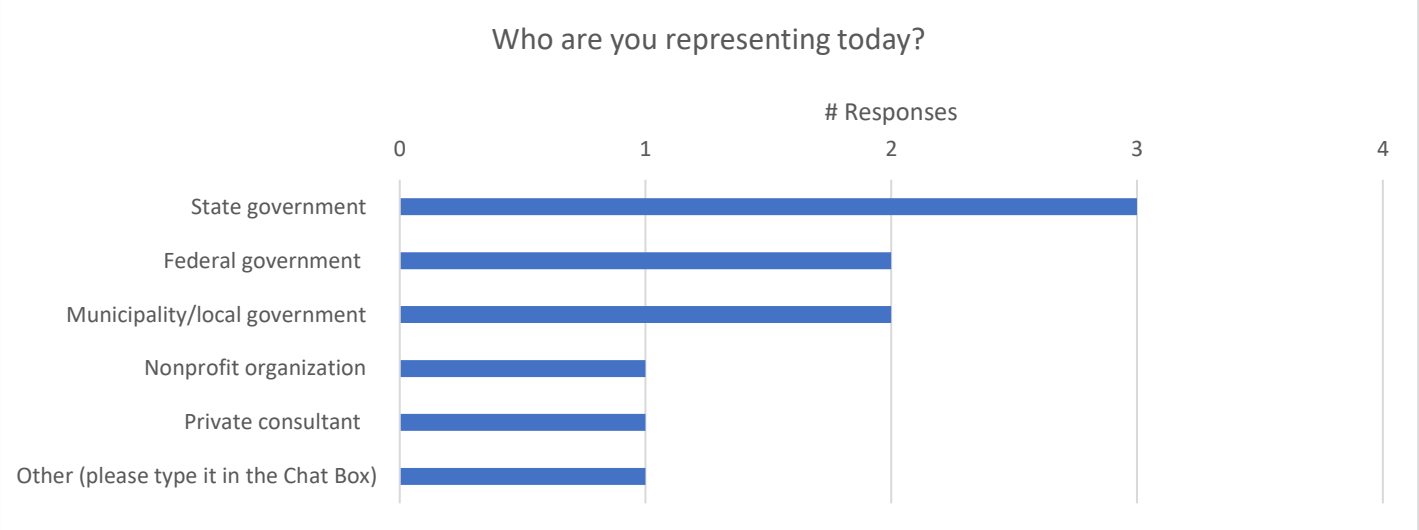
Increased stream temperature is also a concern because forest cover is important for cold-water refugia. There is currently a STAC report under development on this topic. PA DEP is finding that even without tree cover, the stream restoration sites are still covered in vegetation and the substantial groundwater connection is the primary driver of stream temperature. This is inconsistent with findings from the STAC report, but it is dependent on multiple factors and can be a complicated modeling problem.

Meeting Notes

Welcome and Project Overview

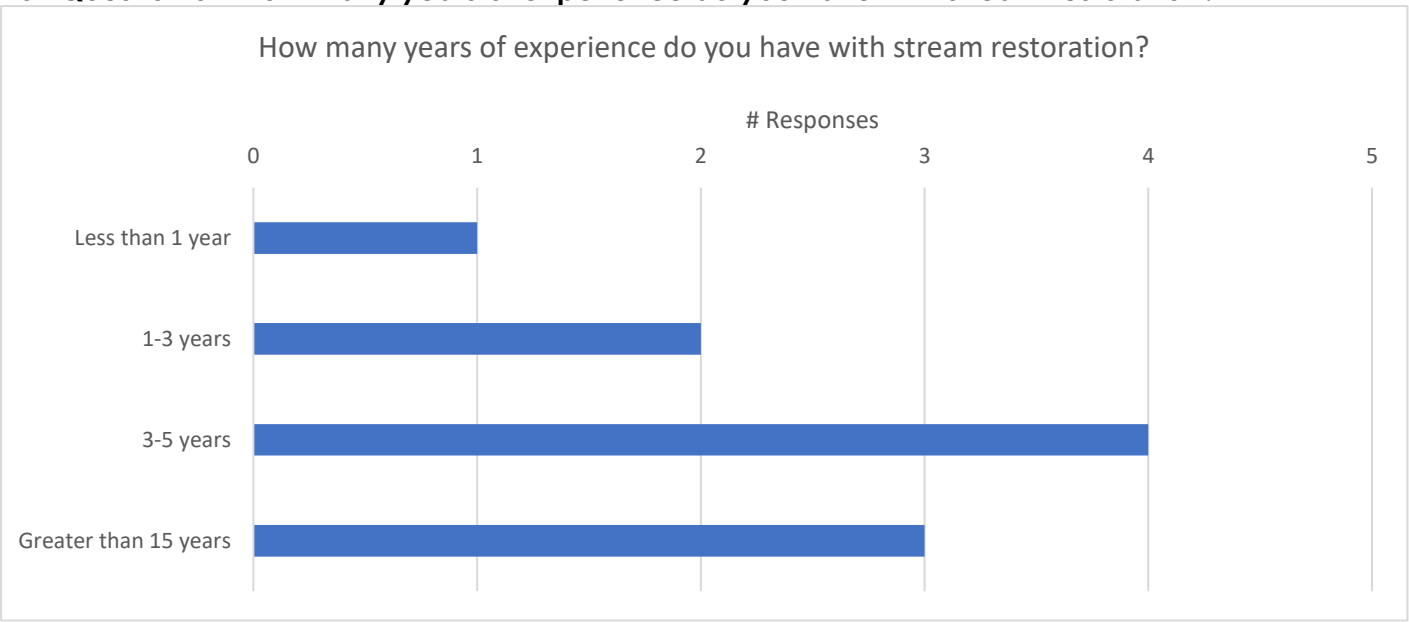
Poll Question 1 – How many people are participating in the webcast today at your location?
All but one attendee joined the webcast individually; one attendee indicated joining in as a group of 2 – 5.

Poll Question 2 – Who are you representing today?



Mike LaSala responded "Other," as he considers his role to be a combination of private consulting, non-profit, and local government.

Poll Question 3 – How many years of experience do you have with stream restoration?



Lisa Fraley-McNeal (CWP) – Overview of the Maintaining Forests in Stream Corridor Restoration and Sharing Lessons Learned Project

Given the concern over the potential negative impacts of stream restoration, CWP received a grant from the Chesapeake Bay Trust to evaluate how these unintended outcomes can be minimized in the riparian area, including forest buffers, to improve riparian and stream habitat quality.

A Stakeholder Team was formed to provide input and help guide the project.

Background Information

- The CBP Stream Restoration Expert Panel Crediting Protocols were finalized in 2014. The credits contributed as a driver for implementation of stream restoration projects. Other benefits and considerations of projects beyond nutrient and sediment load reduction were often lost.
- The updated CBP stream restoration protocols based on recent workgroup updates help to address stream health more comprehensively.
- With sediment being one of the main stressors of biological impairment, there is a regulatory incentive to address it. Stream restoration is being done to meet local TMDLs in addition to the Bay TMDL.
- The rapid increase in stream restoration projects throughout the Chesapeake Bay watershed has led to growing concern and controversy about their effects on whole-ecosystem health and services.
- One of the arguments against stream restoration is that we should be looking upstream to implement BMPs instead. However, some considerations of this approach are 1) that it can take years before an effective geomorphic change is identified due to changes in the flow regime, and 2) Implementing enough upstream BMPs to create a response at the watershed scale is often not feasible depending on the watershed conditions.

Completed project tasks include: 1) project planning and preparation, 2) QAPP, 3) policy/document review and interviews, and 4) case study analysis.

The webcast task is currently in progress and will be completed by 5/31/2022.

The next task is to synthesize results from the completed project tasks into a final project report that includes recommendations on opportunities to improve consideration of riparian forests in stream corridor restoration projects to minimize unintended consequences. Recommendations from the project report will be used to update and finalize a best practices guidance document for local governments.

State, Local Government, and Practitioner Presentations

Dave Goerman (PA DEP) – Considering Forests in Stream Corridor Restoration
Dave represents the Bureau of Waterways Engineering and Wetland perspective but does not represent the perspective of all PA DEP depts.

Regulatory Requirements

- All projects that involve waterways and wetlands require a vegetative assessment with several modules.
- The Level 2 Rapid Assessment, which is a requirement of 25 Pa. Code § 105.15. Environmental Assessment that aims to characterize current conditions, can be waived by writing, and, in many instances, those requirements are waived.
- The program recognizes equivalency in establishing the vegetative form that is most appropriate given the site conditions.
- 25 Pa. Code § 105.15. Environmental Assessment requires that stream degradation is demonstrated and that the underlying cause of degradation is identified. The definition of an acceptable vegetative outcome is driven by what approach addresses the underlying cause of degradation. Topology, soils, and hydrology all influence what type of vegetation should be present at a site.

The current regulatory standard for compensatory mitigation site design uses all vegetative structure types and focuses on creating a heterogenic structure on-site. This gives all vegetation a chance to establish itself with an approach that highlights design over planting. PA DEP is in the process of shifting to a "restoration community design targeting approach," which targets specific community types that are suitable for the site to inform/direct practitioner approaches to planting design.

Key requirements for projects in PA include:

- Chapter 105 Dam Safety and Waterway Management [25 Pa. Code § 105.12(16)]. Waiver of permit requirements, which follows a specific assessment designed for restoration activities, although they are undergoing change.
- Chapter 102 Erosion and Sediment Control [25 Pa. Code § 102.5(i)]. Permit requirements would be exempt from ESC and NPDES permits when Section 404 permit coverage is required.

Restoration

In the past, what constitutes "restoration" has been pretty broadly interpreted, and many use the term "restoration" as a blanket term to cover a variety of different stream activities. PA DEP is shifting from a traditional environmental assessment to one that is specifically targeted for restoration activities. Additionally, PA DEP is working to establish a comprehensive training on restoration where they hope to standardize use of the terminology—these should be finalized in late 2022 or early 2023. If a proposed project is evaluated as a restoration or a "manipulation of the degraded riverine environment," it can influence permit requirements and the entity responsible for

reviewing the application. For PA DEP restoration addresses the underlying causes of resource degradation within modern constraints. Targeting symptoms of degradation would not be considered restoration under this definition.

Some successful restoration project examples include:

- Project with legacy sediment removal and headcut restoration; mass-wasting and the runoff of legacy sediment were the underlying causes of degradation.
- Early successful legacy sediment removal at Lititz Run – LandStudies (10- to 12-years-old)
- Mitigation bank site with multiple headwater tributaries; legacy sediment was removed within an existing perched wetland system (some of which are dominated by hillslope process). The stream was draining the wetland and exfoliating the bedrock—the vegetation structure is advancing at this site.
- Project with 4 – 5 feet of legacy sediment—some of the wetlands were left perched on the legacy sediment. The legacy sediment was determined to be the underlying cause of degradation at the site.

Guidance

The purpose of the project or program may dictate the use of specific guidance.

- Act 162 Riparian Forest Buffers Act
- 25 Pa. Code § 102.14. Riparian Buffer Requirements
- Agency-specific guidance from PA DCNR, PA DEP, PFBC, CREP, etc.
- 25 Pa. Code §105.15. Environmental Assessment
- PA Function-Based Compensation Protocol
- PA Resource Condition Level 2 Rapid Assessments
- PA Community Prediction Tool for Site Restoration (in development)

Questions

Sally Claggett – I would be interested in hearing more about the extent of invasive species control required for compensatory mitigation.

Response – We have a total percent cover for the site (10%) and an individual location percent cover (5%), I believe those are the numbers if my memory serves me correct.

Sally Claggett – Is Section 105 (Envi Assessment) what you said is often waived?

Response – We can waive the requirements that are in the EA, such as assessment, alternatives analysis.

Mike LaSala (LandStudies) and Charity Burkhart (David Miller/Associates) – A Perspective on Stream Restoration in Lancaster County

Their presentation focused on the County and local perspective of stream restoration. Charity discussed the thoughts and actions of local municipalities and Mike's portion of the presentation emphasized communication and the Lancaster County-Wide Action Plan (CAP)—Mike is the CAP Coordinator for Lancaster County.

Lancaster County, PA Overview

The area is known as an eclectic mix of agriculture and urban with 5,500 farms and 52 MS4 areas. 50% of their streams are listed as impaired.

Typical Stream Projects

- Floodplain Restoration (includes stream and floodplain area, legacy sediment removal)

- Direct Restoration (regrade streambanks, channel realignment)
    - A direct restoration is a broad category and a common approach that's relatively easy to meet from a permitting standpoint.
- Augmented Restoration or Manipulation (fish passage or habitat; selective streambank stabilization and restoration techniques)

Project locations are identified in three main ways: 1) industry professionals and interested individuals, 2) indirect individuals and entities, and 3) the public.

- Identified projects are often systems that could use some attention.
- Projects choice really comes down to the aesthetics, whether it's appropriate for the system or not
- One of the key goals is to understand what landowners/stakeholders/the public want in terms of aesthetics at a site, and then to balance that with what the regulations require.

Lancaster Clean Water Partners (LCWP) focuses on education and outreach to achieve clean and clear Lancaster streams. This led to the development of the Countywide Action Plan (CAP) to achieve the collective goals.

- CAP funding contributes to a variety of projects in the Lancaster area, most of which are stream restoration projects.

Riparian vegetation considerations during site assessment:

- What vegetation currently exists?
- Is the vegetation worth saving?
- Can they overplant elsewhere?
- Will the buffer be a traditional woody buffer or something different?
- Does it currently provide some other type of benefit?
- Along with long term maintenance considerations for overall success – Does the property owner have those resources?

There are challenges with property constraints and property owner willingness to install projects of reasonable size, etc.

<u>Regulations</u>

The goal is to abide by all applicable regulations holistically.

- Municipal Conservation Easement requirements
- DEP & Army Corps requirements
- Cost benefits or challenges to the installation process (the project requires justifications)
- How to encourage these to be municipally valuable to meet other requirements (MS4, etc.)? Is the buffer valuable to them?
    - Municipalities want multiple benefits or the most beneficial project so that it is justifiable.

Current project design proposals include:

- Traditional woody buffers (tree tubes and stakes bordering creeks and streams)
- Grass buffers (stabilization seed mixes)
- Hybrid approaches (tailored to bankside constraints)

<u>Installation & Design</u>

Design and implementation is informed by what's feasible and maintainable for the clients and what can get done through permits.

- For example, Plain Sect communities equated stream bank restoration with a traditional woody buffer that they didn't like because the woody buffers bring more wildlife and more invasives into the area. Work with the community involved educating them about the different types of restoration projects and what they might prefer over a woody buffer.

Example Projects

- Lime Spring Square Project (Municipal)
  - A Legacy Sediment Removal project – legacy sediment was the true impairment (lack of ecosystem and ecology, flooding, and infrastructure damage)
  - wide open herbaceous floodplain community historically and what's observed from a flooding and flow standpoint
  - The client was really interested in the co-benefits of the project.
  - The project resulted in a paradigm shift in the train of thought to looking at the extent of the watershed.

Questions/Comments

Sally Claggett - Agree that maintenance should be part of every contract or don't do project.

Response - Agreed with Sally, our municipalities enter a maintenance agreement with the property owner prior to installation of any projects on private property. We typically have a written maintenance plan as well.

Sally Claggett - @Charity-- we have moved away from requiring/requesting landowners to do maintenance (not likely to happen) but are strongly encouraging it to be wrapped into the project design and have it contracted.

Response - @sally, we are too. Our municipalities which are asking property owners to contribute land for a restoration are typically taking on maintenance responsibilities for a period of 3-5 years.

Sally Claggett – For what it's worth (FWIW), we feel that the full 5 years is often necessary.

Liz Feinberg - generally, can you speak to cost effectiveness, or best approaches, when sewer line/utility is in floodplain/valley

Response - Liz, I know mike has more experience in floodplain restoration as it relates to utilities. Ours are typically on the fringe of the extent of a buffer or restoration project, so they can be worked around. Banta Site on Lititz Run – runoff finds the least path of resistance often where there is a utility line – once restored, the stream was moved about 100 yards from where it was found and the sewer line placement wasn't an issue. Development of walking trails over sewer lines has been a creative way to work around these challenges. Sometimes they just need to be relocated.

Katie Brownson - What sort of resources are available to assist landowners with maintenance? And what sort of follow-up happens to ensure the landowner is following the maintenance agreement/plan?

Response - @kate, our follow up from the municipality requires inspection of installed BMPs every 5 years and a yearly maintenance inspection by the property owner. This is followed up on in our MS4 program. Also our CAP team tries to help facilitate funding for buffer maintenance as well.

Sally Claggett - its good to know that the municipality is responsible for the maintenance for the first 3-5 years.

Response - @sally, we figure that the critical failures (aside from crazy 100 yr+ rain events) will happen generally within 3-5 years. And from mikes perspective, landstudies also is able to contract maintenance with property owners through their field ops division. But while these are best case scenarios we understand not all of them are able to do this.

Project Results Presentation

Chris Swann (CWP) – Policy/Document Review and Interviews
Policy/document review: The goal was to better understand the requirements of each state for protecting and mitigating damage to stream buffers associated with stream restoration projects. A total of 40 regulatory and 78 technical/guidance documents were reviewed.

Interviews: The goals were 1) to better understand how the requirements identified from the review of regulatory and policy documents are (or are not) implemented in each jurisdiction and 2) to identify and refine best practices to minimize adverse impacts to riparian forests. A total of 19 individuals were interviewed, representing state and local governments, as well as practitioners.

Chris provided an overview of how forests are defined for this project and the key federal policies reviewed. He also summarized the key findings and identified best practices related to site selection and planning, design and permitting, implementation, and post-construction monitoring.

The deliverable for this task was a technical memo that will be included in the final project report.

No questions on the Policy Review & Interview presentation

Alexandria Wilkins (CWP) – Case Study Analysis
Reviewed 10 stream restoration projects in Lancaster County, PA, Anne Arundel County, MD, and Fairfax County, VA to determine the extent to which requirements are implemented and quantify the impacts stream restoration has on riparian vegetation.

Utilized loading rates from CAST to determine changes in nutrient and sediment loading from the stream restoration projects and impact to the riparian vegetation due to project implementation.

Alexandria walked through 5 case study example projects and summarized the key findings.

Case study results were summarized in 3- to 5-page summaries for each site that will be included in the final project report.

<u>Case Study Analysis Questions</u>
Sally Claggett - interesting that Muddy Ck project also seemed to add a road to the floodplain

Katie Brownson – There is a pretty big difference between the load reductions calculated using the planning rates and the CBP Crediting protocols- could you say a little more about why this is the case?

Lisa clarified that the planning rates were used so a consistent credit estimate could be obtained across all of the case study projects because it is a lbs reduction per linear foot. The reductions based on the crediting protocols were included as they were provided without further verification. Depending on how the protocols were calculated there could be different results. Generally, the

planning rate was designed to be more conservative, and it was anticipated that results from the crediting protocols would result in higher load reductions.

Dave Goerman - How is there an increase in TSS when you go from ag pasture to wetland (non-pastured)? There should be a net decrease.

Lisa noted that this was due to loading rates in CAST being slightly higher for wetlands than for agricultural pastureland.

Facilitated Discussion

Sally Claggett – Prehistoric condition analysis of what "should" be present, do other state's do this? Doesn't know how researched that it or if it's at all controversial. Mike mentioned it being about aesthetics. How do the various drivers…what % of projects are based on each driver for both project selection and design?

Dave – underlying science is very robust, no question in their program for the benefits and rewards for this approach. Massive projects, zero failures as far as success, diverse and resilient conditions – way more that he anticipated. For compensatory mitigation, they are very strict about what they allow and don't allow. These projects are very resilient to climate change, etc. Very low maintenance projects. They are curious why people have fought this for so long

Sally – surprised they're don't have issues with invasives

Dave – sites are full of invasives at first but once plantings are established and with invasive treatments the plantings thrive.

Sally – Lime Spring Square – poor habitat before restoration. Where there are similar studies after restoration to show that the fish and mayflies came back?

Mike – higher level/ anecdotal assessment. Pre-construction they didn't notice any evidence of macros (fish or wildlife)

Charity – the municipality still gets to see those monitoring reports from year to year even if they are from a high viewpoint.

Sally Claggett – Clear and clean criteria, MD has a problem with stream temp TMDL on the rise – opening up and slowing down streams can warm them up but also the importance of forest cover for cold water refugia. Feels like this should be something that should be really important to weigh in on these designs.

Dave – it's a settled issue in their minds. Without tree cover, much of the streams are completely covered in vegetation. The amount of groundwater connection is substantial and that's what's driving the stream temperature.

Sally – is there data? They are in the process of writing a STAC report and are finding that groundwater doesn't affect the stream temperature as much as previously thought.

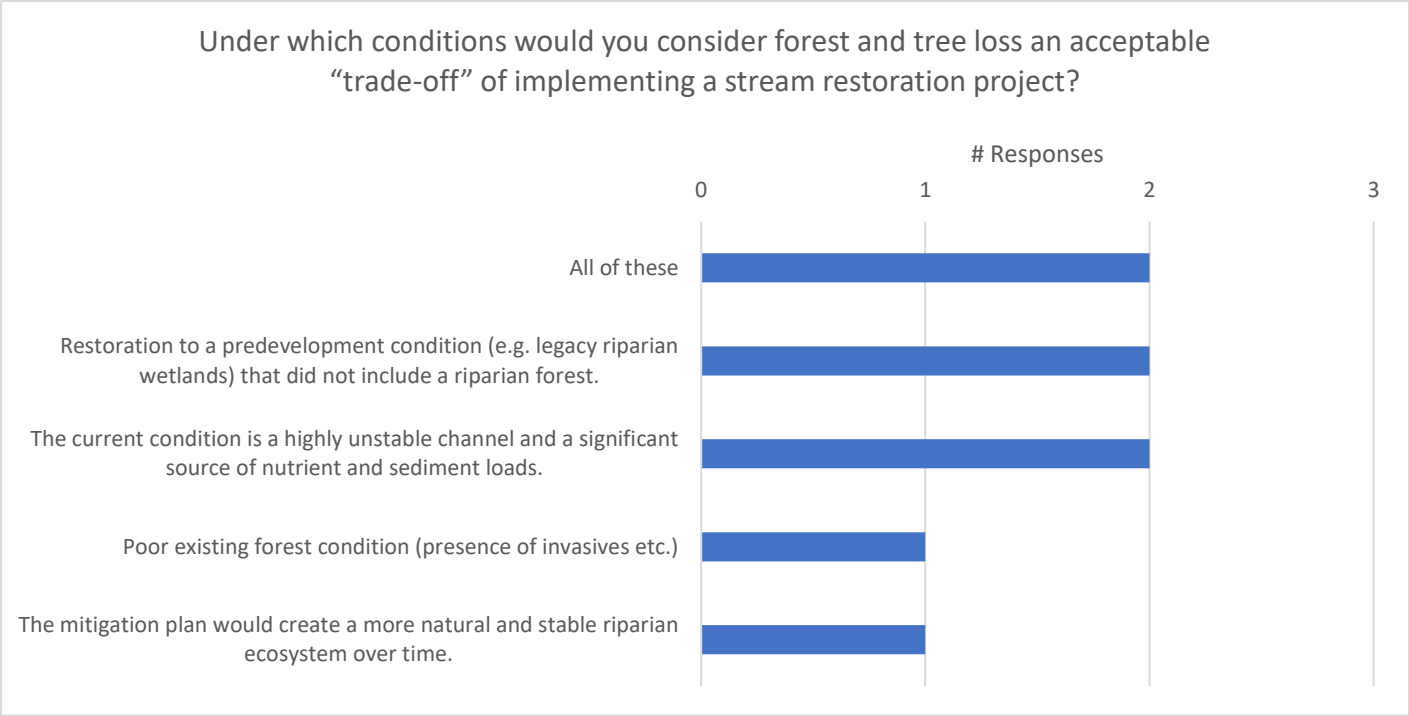
Dave – would argue that groundwater thermal refugia is more important that headcut bank shading(?). Provides more consistent thermal regulation but it can depend on the size of the

stream and other factors. It's a complicated modelling problem. In our observations and work we don't see it as an issue.

Sally – If you have any of those papers that talk about that, it's a good time to contribute those to the STAC report. It's been debated amongst the scientists, so if you have any support for your stance that would be appreciated.

Mike – Lititz Run has consistently seen the temperature maintained with that groundwater connection. It is complicated. At a new site, you have to change how you're thinking. We have to stop trying to create one checkbox for every situation. He will do some digging to find resources and data to help the STAC conversation.

Discussion Question 1 – Under which conditions would you consider forest and tree loss an acceptable "trade-off" of implementing a stream restoration project?



Sally Claggett – In MD, poor forest condition is often a reason for development

Katie Brownson – Struggled with the question, where she felt that one condition alone doesn't make it an acceptable trade-off; Doesn't always feel that reestablishing pre-historic conditions is realistic since things have changed.

Sally – most project do not look at the system holistically; how does the predevelopment condition act as a driver? Lititz Run is an impressive really holistic project.

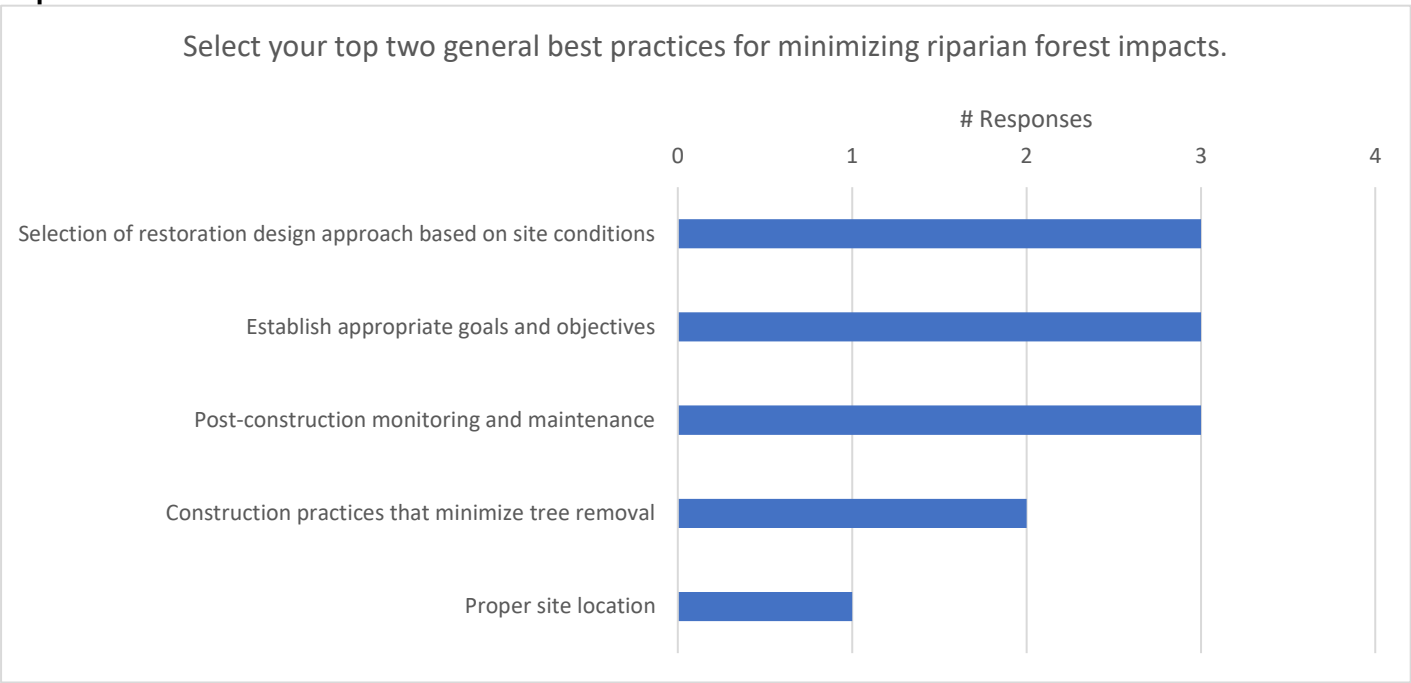
Dave – what they call restoration and what everyone else calls restoration is the difference between the hodge-podge vs the holistic view of the stream and floodplain system.

Mike - Rock Lititz is an example of a full scale restoration approach; an opportunity because of development – primary driver was Agnes in 1972 (from a down stream flood control standpoint). There's a difference between restoration and "manipulation"

Dave – biggest project in PA, mitigation bank that restored over 100,000 ft of stream restoring wet swales to a 30 sq mi drainage area with alluvial fans in between (Robinson Fork mitigation bank in southwest PA)

Mike – Lititz Run still have riparian corridors where it makes sense.

Discussion Question 2 – Select your top two general best practices for minimizing riparian forest impacts.



Top 3: Establish appropriate goals and objectives, selection of restoration design approach based on site conditions, post-construction monitoring and maintenance.

Sally – planting plans and techniques aren't needed if you have appropriate goals and objectives.

Mike – monitoring and maintenance is probably the most important because if you don't prioritize this all the other work tends to be a waste.

Discussion Question 3 – How should we take into consideration forest health decline that is occurring due to numerous factors (even without effects from stream restoration projects)? These factors include dominance by invasive and native vines, loss to invasive diseases/pests, competition from non-vine invasives, excess herbivory, and climatic-induced loss.

Sally – A lot of money is going into these opportunistic stream restorations – Invest some of that money in forest health and do both.

Dave – In PA, they are throwing money away on riparian buffers and spending oodles of money on forest health. Plantings on incised streams and have no effect on erosion, etc. Nobody assesses geomorphic conditions or if that's the appropriate tool for the site or situation.

Mike – People are rewarded for buffers. The accounting system is setup from a singular standpoint where the buffer counts the same no matter where you put it and the same applies to stream restoration. There are assumptions that we need to revisit in CAST, especially on BMP performance.

Sally – There are multiple issues with CAST and the expert panel reports are not perfect. The opaqueness of the stream restoration credits is a constant complaint. It is a very difficult process getting to the point that we are in. Credits applied to stream restoration were not at all conservative, and project were not put in the right places or weren't big enough. State agencies are pushing back…would like to hear if people find them understandable.

Dave – Agrees that they are complicated, but we are talking about complicated natural resources and the effort was trying to take account for those when being applied. Conservative approach in sediment reductions and there's still a lot to be learned in sediment credits. The stream crediting protocols that were recently revised was the best attempt at evidence based.

Sally – very complicated to try to find the multiple landowners to get these big projects done. State agencies are saying wait a minute…habitat isn't improving.

Dave – they don't have appropriate assessments to assess the restored system correctly. It may not be improvement based on macroinvertebrate data because you shift the food chain in these projects, but it's a more health redundant system from another standpoint. These are complicated difficult projects especially in the urban and suburban area. There is an abundance of sites but it is hard to find willing landowners. When you say stream restoration, we are likely not talking about the same thing.

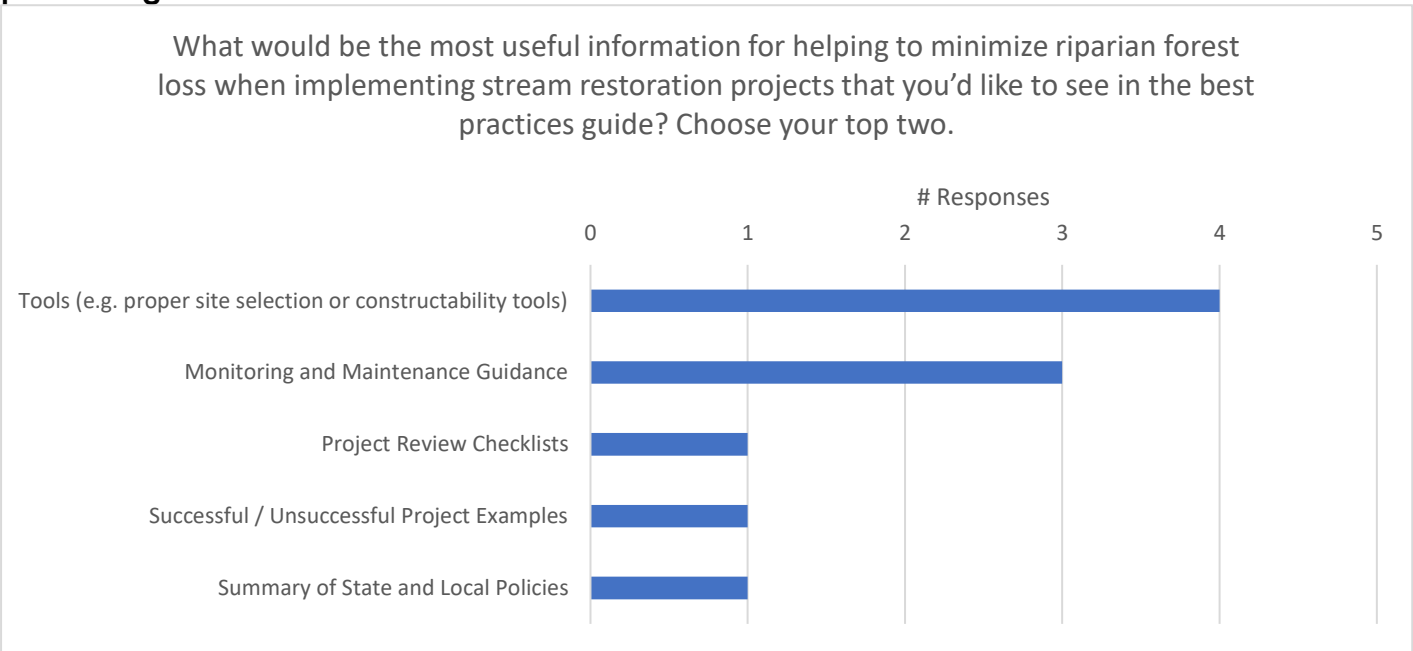
Mike – It might be helpful to better classify or delineate stream restoration into more helpful buckets. We just lump stream restoration into one bucket but not all restorations are the same, and that's the case with a lot of BMPs.

Dave – consistent use of terminology is an important factor

Discussion Question 4 – How can monitoring efforts for riparian forests that are part of stream restoration mitigation plans be improved?

Since we are short on time, the attendees are asked to email Lisa or Chris with thoughts they would like to share regarding question 4.

Discussion Question 5 – What would be the most useful information for helping to minimize riparian forest loss when implementing stream restoration projects that you'd like to see in the best practices guide?



Webcast Chat Log[2]

00:58:51 Chris Swann: Hi Everyone,

01:02:44 Mike LaSala: Private, non-profit, and local government

01:22:31 Sally Claggett: I would be interested in hearing more about the extent of invasive species control required for comp mitigation

01:38:47 Sally Claggett: Is Section 105 (Envi Assessment) what you said is often waived?

01:40:34 Dave Goerman: We can waive the requirements that are in the EA, such as assessment, alternatives analysis.

01:42:45 Dave Goerman: We have a total percent cover for the site (10%) and an individual location percent cover (5%), I believe those are the numbers if my memory serves me correct.

[2] Note that the chat log was copied directly from the webcast and has not been edited for grammatical correctness.

01:54:47 Sally Claggett: "clean and clear and cold"

02:00:02 Sally Claggett: Agree that maintenance should be part of every contract or don't do project.

02:06:31 Liz Feinberg: generally, can you speak to cost effectiveness, or best approaches, when sewerline/utility is in floodplain/valley.

02:11:17 Charity Burkhart: Agreed sally, our municipalities enter a maintenance agreement with the property owner prior to installation of any projects on private property. We typically have a written maintenance plan as well.

02:12:24 Katie Brownson: What sort of resources are available to assist landowners with maintenance? And what sort of follow-up happens to ensure the landowner is following the maintenance agreement/plan?

02:13:25 Charity Burkhart: Liz, I know mike has more experience in floodplain restoration as it relates to utilities. Ours are typically on the fringe of the extent of a buffer or restoration project, so they can be worked around.

02:13:42 Sally Claggett: @Charity-- we have moved away from requiring/requesting landowners to do maintenance (not likely to happen) but are strongly encouraging it to be wrapped into the project design and have it contracted.

02:17:55 Charity Burkhart: @sally, we are too. Our municipalities which are asking property owners to contribute land for a restoration are typically taking on maintenance responsibilities for a period of 3-5 years.

@kate, our follow up from the municipality requires inspection of installed bmps every 5 years and a yearly maintenance inspection by the property owner. This is followed up on in our MS4 program. Also our CAP team tries to help facilitate funding for buffer maintenance as well.

02:19:23 Sally Claggett: @Charity - Thanks!

02:20:01 Sally Claggett: its good to know that the municipality is responsible for the maintenance for the first 3-5 years.

02:30:18 Sally Claggett: thanks again Charity. FWIW, we feel that the full 5 years is often necessary.

02:56:48 Sally Claggett: interesting that Muddy Ck project also seemed to add a road to the floodplain

02:57:24 Katie Brownson: There is a pretty big difference between the load reductions calculated using the planning rates and the CBP Crediting protocols- could you say a little more about why this is the case?

02:58:23 Dave Goerman: How is there an increase in TSS when you go from ag pasture to wetland (non-pastured)? There should be a net decrease.

02:59:22 Charity Burkhart: In the projects detailed have you noticed if any invasive species have worked their way in or are those spot maintained as part of the maintenance program?

03:00:11 Dave Goerman: Big Spring run has some but they are minor and it has not been maintained.

03:02:30 Charity Burkhart: @dave thanks! I was kind of assuming that there was so much native material that it was choking out invasives but I've seen enough phragmites in wetland areas that I didn't know if things like that were an issue with these.

03:04:36 Dave Goerman: Typically they are vary diverse and with significant micro-topography and are self protecting from invasive species.

03:22:30 Katie Brownson: Do you have any published studies or reports you could share on the impacts of legacy sediment removal projects on temperature? That would be very helpful for the STAC report Sally mentioned.

03:47:21 Sally Claggett: too bad no one from DCNR is on

03:56:30 Sally Claggett: thanks for the discussion! I gotta run

03:57:48 Katie Brownson: Yes- some of this nuance in restoration design/impacts is important to capture when thinking about how to minimize unnecessary forest loss.

04:01:07 Dave Goerman: As far as monitoring EPA just came out with guidance on developing better monitoring and data management. BWEW is going to look at it for both compensation and grant restoration work.

04:01:43 Dave Goerman: thanks!

MD Webcast Summary

State Webcast Information

Maryland

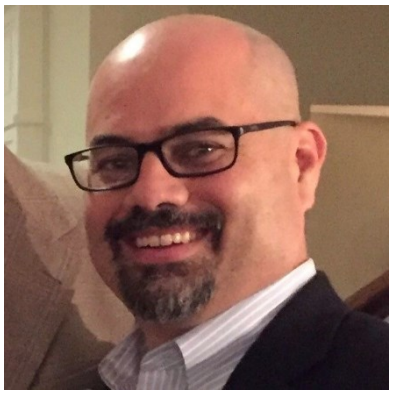
May 20th, 2022

Agenda

Date/Time	Friday, May 20, 2022, 1:00 PM – 4:00 PM	
Webcast Recording Link	https://us06web.zoom.us/rec/share/7MpSzg26koCGWuuIyQ3n2gTVl3LgG5Yf-Mv_x98Nj6Z5Twsn_F9TK0F8GDnSJ7Mg.M_wLMwfhDPujDymU	
Link to PDF of Slides	https://www.cwp.org/wp-content/uploads/2022/05/Maintaining-Forest-Webcast-Presentation-Maryland-final.pdf	
Time	**Agenda Item**	**Presenter**
1:00 PM – 1:20 PM	Welcome and Project Overview	Lisa Fraley-McNeal, CWP
1:20 PM – 2:20 PM	State Agency, Local Gov, and Practitioner presentations	Denise Clearwater, MDE Tony Redman, MD DNR Marian Honeczy, MD DNR
		Erik Michelsen, Anne Arundel County
		Bryan Seipp, Ecotone
2:20 PM – 2:25 PM	Break	
2:25 PM – 3:05 PM	Presentation of Maintaining Forests Project Results	Lisa Fraley-McNeal, CWP
		Chris Swann, CWP
		Jordan Fox, CWP
3:05 PM – 3:10 PM	Break	
3:10 PM – 3:50 PM	Facilitated Discussion	Lisa Fraley-McNeal, CWP
3:50 PM – 4:00 PM	Wrap up and Next Steps	Lisa Fraley-McNeal, CWP

Presenters

Presenter	Biography
	**Denise Clearwater, Maryland Department of Environment** Denise Clearwater is the special projects coordinator in the Wetlands and Waterways Program in the Maryland Department of the Environment. She has a background in developing and implementing programs in wetland regulation, wetland training, and mitigation, as well as managing special projects for grants and program improvement and assisting in policy development. She has represented the MDE's Wetlands and Waterways Program on numerous interagency work groups for regulatory, wetland monitoring, restoration, preservation, and stream health and as an at-large Board member of the National Association of Wetland Managers. She is also a member of the Society of Wetland Scientists. Denise has a B.S. in zoology from the University of Maryland and an M.S. in wildlife management from Frostburg State College (now University).

Presenter	Biography
	**Erik Michelsen, Anne Arundel County, MD** Erik is currently a Deputy Director for Anne Arundel County's Department of Public Works, heading its Bureau of Watershed Protection and Restoration. He works to facilitate the recovery of the Chesapeake Bay and its tributaries through supporting robust restoration projects and rigorous scientific monitoring efforts, bolstered by diverse stakeholder partnerships. Erik has an extensive background as a project manager for an environmental consultant then as the Executive Director for a non-profit, the Arundel Rivers Federation (formerly the South River Federation), and working for Anne Arundel County since 2014, as the County builds up the environmental assessments, restoration implementation, and ecological evaluation to support the County's clean water obligations under the Municipal Separate Storm Sewer System (MS4) permit and the Chesapeake Bay Total Maximum Daily Load (TMDL).
	**Bryan Seipp, Ecotone** Bryan Seipp is Director of Project Development for Ecotone, LLC. a design-build ecological restoration firm located in Forest Hill, Maryland. Bryan is a licensed registered forester in Maryland with over 20 years of experience in the forestry and watershed management field. Bryan has worked in the forestry, agriculture, stormwater, and land protection sectors and has managed the implementation of a wide variety of water quality improvement projects, including stream restoration, throughout the Chesapeake Bay Watershed. Bryan currently serves as the chair of the Maryland Sustainable Forestry Council and president of the Catoctin Land Trust. In his free time Bryan enjoys spending time with his family and mountain biking.
	**Lisa Fraley-McNeal, Center for Watershed Protection, Inc.** Lisa is a Sr. Watershed & Stormwater Research Specialist for the Center. She has been working on urban watershed and stormwater management since 2006. Her areas of expertise include GIS and field methods for watershed assessment, watershed planning, stream restoration, Chesapeake Bay TMDL crediting, and applied research on topics related to watersheds and stormwater. She has a B.S. degree in Geography and Environmental Systems, with a writing minor and cartography certificate from the University of Maryland, Baltimore County. Lisa also has a M.S. degree from the University of Maryland, Baltimore County in Marine and Estuarine Environmental Science.

Presenter	Biography
	**Chris Swann, Center for Watershed Protection, Inc.** Chris is a Watershed Planner & Environmental Analyst for the Center. He has been a watershed planner at the Center since 1997. His work time is split between two responsibilities: researching and writing technical guidance on watershed management issues and trying to keep the Center's technology in check and functioning properly. Since joining the Center, Chris has contributed to the writing of numerous Center publications, including the Urban Subwatershed Restoration Manual series and the Better Site Design Manual. Chris has a B.S. in Natural Resources Management from the University of Maryland, as well as a B.S. in Biology from James Madison University.
	**Jordan Fox, Center for Watershed Protection, Inc.** Jordan is a Watershed & Stormwater Research Specialist for the Center. She joined the Center full-time nearly 5 years ago after graduating from Washington College in Chestertown, MD with a B.S. in Environmental Science, a B.S. in Biology, and a minor in chemistry. Her areas of expertise include GIS, field methods for watershed assessment and monitoring, and research on diverse watershed- and stormwater-related topics. Her favorite projects involve spatial analysis, data-driven deliverable creation, technical writing, and both desktop and field research.

Registrants

Webcast Attendance
Total Number of Registrants: 73
Total Number of Webcast Attendees: 54

Name	Email Address	Webcast Attendance
Alexander Bratchie	abratchie@howardcountymd.gov	**N**
Alexandria Wilkins	ajw@cwp.org	**Y**
Alison Santoro	alisona.santoro@maryland.gov	**Y**
Amanda Bland	abland@allianceforthebay.org	**N**
Amanda Pollack	ahp@cwp.org	**Y**
Amy Reed	amelia.reed@delaware.gov	**Y**
Anne Hairston-Strang	Anne.Hairston-Strang@maryland.gov	**Y**
Ari Engelberg	ari.engelberg@maryland.gov	**N**
Aubin Maynard	amaynard@mwcog.org	**Y**
Bel Martinez da Matta	maria.martinezdamatta@maryland.gov	**Y**
Bertha Berrios	pwberr30@aacounty.org	**Y**
Bill Stack	bps@cwp.org	**Y**
Brenda Morgan	pwmorg63@aacounty.org	**N**
Bryan Seipp	bseipp@ecotoneinc.com	**Y**
Carol Wong	ckw@cwp.org	**Y**
Carrie Decker	carrie.decker@maryland.gov	**Y**
Charles Smith	Charles.Smith@fairfaxcounty.gov	**N**
Chris Swann	cps@cwp.org	**Y**

Webcast Attendance Total Number of Registrants: 73 Total Number of Webcast Attendees: 54		
Name	**Email Address**	**Webcast Attendance**
Christina Lyerly	christina.lyerly@maryland.gov	**Y**
Christopher Victoria	pwvict16@aacounty.org	**Y**
Christy Ciarametaro	christy.ciarametaro@montgomerycountymd.gov	**Y**
Claudia Donegan	claudia.donegan@maryland.gov	**N**
Darian Copiz	darian.copiz@montgomerycountymd.gov	**N**
Debbie Herr Cornwell	deborah.herrcornwell@maryland.gov	**Y**
Denise Clearwater	denise.clearwater@maryland.gov	**Y**
Doug Streaker	dstreaker@biohabitats.com	**Y**
Douglas Griffith	pwgrif04@aacounty.org	**Y**
Emily Trethewey	est@cwp.org	**Y**
Erik Michelsen	pwmich20@aacounty.org	**Y**
Ginger Ellis	pwelli16@aacounty.org	**Y**
Greg Golden	greg.golden@maryland.gov	**Y**
Heather Ambrose	heather.ambrose@fairfaxcounty.gov	**N**
Ho-Ching Fong	Ho-Ching.Fong@montgomerycountymd.gov	**Y**
Iris Allen	iris.allen@maryland.gov	**Y**
Janis Markusic	pwmark02@aacounty.org	**Y**
Jeff Sweeney	sweeney.jeff@epa.gov	**Y**
Jeff White	Jeff.White@Maryland.gov	**N**
Jim George	jim.george@maryland.gov	**Y**
Jordan Fox	jf@cwp.org	**Y**
Karen Cappiella	kc@cwp.org	**N**
Karl Berger	kberger@mwcog.org	**Y**
Katie Brownson	katherine.brownson@usda.gov	**Y**
Kenneth Bawer	kbawer@msn.com	**N**
Laura Callens	lcallens@res.us	**Y**
Laura Kelm	laura@greenvestus.com	**N**
Laura Todd	ltodd@allianceforthebay.org	**N**
Lindsay DeMarzo	ldemarzo@howardcountymd.gov	**Y**
Lisa Fraley-McNeal	lfm@cwp.org	**Y**
Marian Honeczy	marian.honeczy@maryland.gov	**Y**
Mark Hoffman	mhoffman@chesbay.us	**Y**
Mark Symborski	mark.symborski@montgomeryplanning.org	**N**
Matt English	matthew.english@dc.gov	**N**
Matt Stover	matthew.stover@maryland.gov	**Y**
Megan Fitzgerald	fitzgerald.megan@epa.gov	**Y**
Meghan Fellows	meghan.fellows@fairfaxcounty.gov	**Y**
Melissa Chatham	melissa.chatham@maryland.gov	**Y**
Miranda Reid	miranda.reid@montgomerycountymd.gov	**Y**
Natasha Shangold	nlshangold2014@gmail.com	**N**
Nathan Forand	nforand@baltimorecountymd.gov	**Y**

Webcast Attendance Total Number of Registrants: 73 Total Number of Webcast Attendees: 54		
Name	**Email Address**	**Webcast Attendance**
Neely Law	neely.law@fairfaxcounty.gov	**Y**
Nicole Wildart	nwildart@eaest.com	**N**
Paul Bogle	paul.bogle@montgomerycountymd.gov	**Y**
Paul Pitera	ppitera@res.us	**Y**
Phil Jones	phil.jones@montgomerycountymd.gov	**Y**
Rachel Logan	rlogan@salisbury.md	**Y**
Richard Rowland	rrowland@baltimorecountymd.gov	**Y**
Roland Limpert	roland.limpert@maryland.gov	**N**
Ruth Cassilly	rcassilly@chesapeakebay.net	**Y**
Sara Weglein	sara.weglein@maryland.gov	**Y**
Sarah Hilderbrand	sarah.hilderbrand@maryland.gov	**Y**
Sophia Grossweiler	sophia.grossweiler@maryland.gov	**Y**
Tony Redman	tony.redman@maryland.gov	**Y**
Travis Cooke	tcooke@res.us	**N**

Summary of Key Discussion Points

MD DNR adopted guiding principles related to stream restoration in June 2015 that defines and reviews distinct criteria for various types of stream treatments (e.g., restoration, rehabilitation, engineering, reclamation, stabilization, and enhancement) and noted that not all projects should be considered stream restoration.

Historic or predevelopment conditions for setting vegetation restoration goals do not play a major part in MDE's considerations, which instead evaluates projects based on the value of current conditions. Priority areas and their desirable characteristics are described in other State references, regulations, and goals.

Many stream restoration projects are not affecting forest loss; rather, they are converting a mature forest to a young forest. This is not an advocation for clear-cutting, but it's important to note that young forests are important habitat for certain species like golden-winged warblers and others. Stream temperature is an important consideration of stream restoration design. While shading is one component, restored groundwater hydrology is also important for stream cooling. One problem is that many stream systems are driven by stormwater with limited groundwater-based flow. Microtopography is an important consideration.

Landowner engagement and public outreach/education are important components of stream restoration projects. Many community concerns are in public areas where larger floodplain reconnection projects are proposed. Outreach and education to the public prior to the submission of permit applications to the state should be done to help to reduce community concerns.

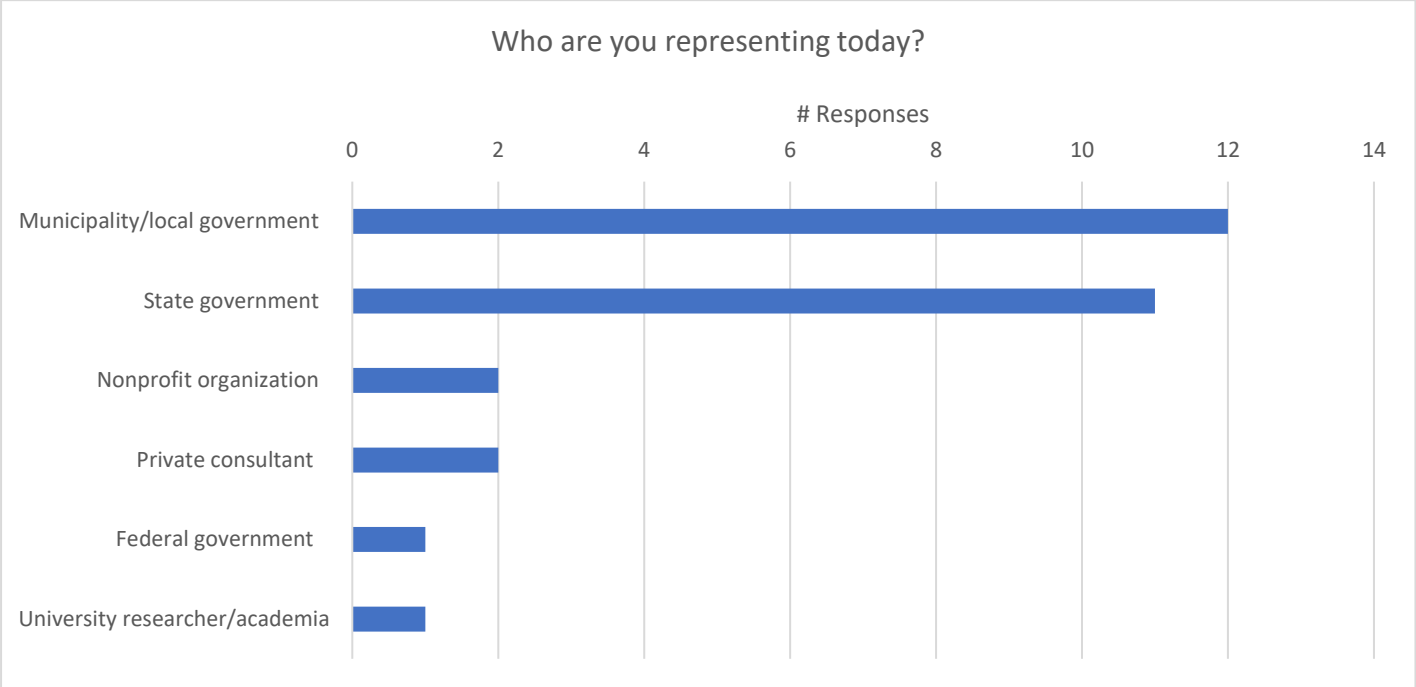
One of the difficulties with monitoring programs is not having an agreed upon functional metric to define a healthy forest. Developing regionally specific riparian monitoring protocols and forest quality indices was suggested. With advances in technology, remote-sensing tools are also useful for broad scale monitoring to supplement on-the-ground investigations.

Meeting Notes

Welcome and Project Overview

Poll Question 1 – How many people are participating in the webcast today at your location?
All attendees joined in individually except for one group of 2 – 5

Poll Question 2 – Who are you representing today?



Poll Question 3 – How many years of experience do you have with stream restoration?

Lisa Fraley-McNeal (CWP) – Overview of the Maintaining Forests in Stream Corridor Restoration and Sharing Lessons Learned Project

Given the concern over the potential negative impacts of stream restoration, CWP received a grant from the Chesapeake Bay Trust to evaluate how these unintended outcomes can be minimized in the riparian area, including forest buffers, to improve riparian and stream habitat quality.

A Stakeholder Team was formed to provide input and help guide the project.

Background Information

- The CBP Stream Restoration Expert Panel Crediting Protocols were finalized in 2014. The credits contributed as a driver for implementation of stream restoration projects. Other benefits and considerations of projects beyond nutrient and sediment load reduction were often lost.
- The updated CBP stream restoration protocols based on recent workgroup updates help to address stream health more comprehensively.
- With sediment being one of the main stressors of biological impairment, there is a regulatory incentive to address it. Stream restoration is being done to meet local TMDLs in addition to the Bay TMDL.
- The rapid increase in stream restoration projects throughout the Chesapeake Bay watershed has led to growing concern and controversy about their effects on whole-ecosystem health and services.
- One of the arguments against stream restoration is that we should be looking upstream to implement BMPs instead. However, some considerations of this approach are 1) that it can take years before an effective geomorphic change is identified due to changes in the flow regime, and 2) Implementing enough upstream BMPs to create a response at the watershed scale is often not feasible depending on the watershed conditions.

Completed project tasks include: 1) project planning and preparation, 2) QAPP, 3) policy/document review and interviews, and 4) case study analysis.

The webcast task is currently in progress and will be completed by 5/31/2022.

The next task is to synthesize results from the completed project tasks into a final project report that includes recommendations on opportunities to improve consideration of riparian forests in stream corridor restoration projects to minimize unintended consequences. Recommendations from the project report will be used to update and finalize a best practices guidance document for local governments.

State, Local Government, and Practitioner Presentations

Denise Clearwater (MDE) – Maintaining Forests in Stream Restoration: Maryland Department of the Environment, Water and Science Administration, Wetlands and Waterways Program

There are a variety of different types of stream restoration implemented in MD, including natural channel design, RSCs, beaver dam analogs, and legacy sediment removal. The types vary by jurisdiction, but the most common types are natural channel design followed by RSCs.

While MDE recognizes that some vegetation may need to be removed during construction, concerns from the public and others about the extent of forest loss and wetland conversion have led us to require a closer examination of forest losses, including requesting additional justifications

and minimization efforts. We're also working on determining the extent of change, and we've begun recommending new practices.

MDE is a state agency that implements the following statutes: Waterways & Floodplain (1933) and Nontidal Wetlands (1989). MDE also has a role in federal licensing and permitting and coastal zone management requirements—DNR also shares coastal zone management responsibilities. Decisions made under the statutes that MDE oversees/implements must weigh public advantages and disadvantages and be in the best public interest.

There are specific water quality criteria for Use III waters that indicates that riparian forest buffers adjacent to Use III waters must be retained whenever possible to maintain necessary temperatures to meet this criterion.

A new checklist for riparian areas was developed in 2021, which expands on previous assessments and requires additional information, like forest stand delineation, marking trees to be removed, and more. There is also new detailed assessment and guidance (funded by EPA) for the upper coastal plain, including upper coastal plain wetlands, in association with stream restoration projects. There is a similar effort underway for the Piedmont and the lower shore coastal plain (which should be completed at the end of 2023). Key wildlife habitat types are a consideration in the assessments.

MDE is required to produce a new study on ecological restoration and permitting by June 2024, to evaluate existing laws/regulations, the permit process, opportunities for public comment, defining ecological restoration, possibly developing a separate permit process for ecological restoration projects, conducting a holistic permit review, and evaluating whether additional staff and resources may be necessary.

Tony Redman (DNR) – Maintaining Forests in Stream Restoration: Maryland Department of Natural Resources

DNR adopted guiding principles related to stream restoration in June 2015; this policy guides actions to support, fund, construct, or review stream restoration project proposals in MD. The policy defines and reviews distinct criteria for various types of stream treatments (e.g., restoration, rehabilitation, engineering, reclamation, stabilization, and enhancement). Not everything should be called a stream restoration project. We're seeing increasing concern about the degree of clearing associated with stream projects. Impacts to existing trees must be avoided or minimized to the maximum extent practicable with ample justification in order for a project to receive DNR support; additionally, all unavoidable impacts to riparian trees must be compensated for/mitigated through afforestation when on-site restoration is not an option.

Marian Honeczy (DNR) – Maintaining Forests in Stream Corridor Restoration & Forest Conservation Act

The compliance requirements for the Forest Conservation Act are: 40,000 sq ft or greater of area disturbed and required grading, sediment control, or subdivision approval. If the project doesn't meet the exception requirements (or a local jurisdiction does not have exceptions for FCA ordinances), then full compliance is required.

The exception criteria indicate that a binding maintenance agreement of at least 5 years must be signed by the affected property owners. Additionally, the stream restoration project must avoid impacts to forests and provide on-site an equivalent number of trees to the number removed by the project. A tree is defined as a woody stem here.

Erik Michelsen (Anne Arundel County) – Forest Impacts in Stream Corridors as a Result of Restoration: Perspectives from Anne Arundel County
In Anne Arundel County (AACo), the following types of stream and wetland restoration are conducted: RSC, legacy sediment removal, valley restoration, beaver dam analogs. We try to duplicate the features that you may get through a legacy sediment removal project, but we're really aiming for integrated stream and wetland complexes as opposed to armored ditches.

These sites are identified through watershed assessments, concerns identified and shared by constituents, staff discovery, remote sensing tools, or some combination of the above methods. High-resolution lidar imagery is also used.

Erik showcased a variety of different projects completed by AACo, including some that were designed to be colonized by beavers.

County regulations and permitting requirements related to riparian forests and stream restoration projects were discussed, including the Forest Conservation Act (FCA). This aligns with what Marian presented. Erik also described the importance of working with the state early in the project development process (e.g., holding pre-permit application meetings). This gives applicants the opportunity to present the project to the regulatory staff, ask questions, and ensure sufficient time for feedback from the regulatory review staff to be incorporated into the project's design before unavoidable time and cost constraints arise later in the project's timeline.

Erik then reviewed some successful projects. The first project (Wilelinor completed about 15 to 17 years ago) included planting a host of Atlantic white cedar trees. Another project, Furnace Branch, is located in an urban part of the state and used to be a lined concrete swale; it has since been replanted as a stream/wetland complex. Post-construction photos showing vegetation establishment at Cat Branch (on the Magothy River) were presented. The Dairy Farm Outfall project was presented (tributary to the Little Patuxent); this is not classified as a stream since it's basically ephemeral due to very sandy underlying soils. For this project, the stream bed was raised during a valley restoration approach.

Bryan Seipp (Ecotone) – Riparian Vegetation Impacts from Stream Restoration
Bryan offers a unique perspective as a forester. While it's important to minimize tree loss, some trees do need to come down in the process of stream restoration projects; those removed trees are needed and are used as part of the project. One of Ecotone's goals is to create not only healthy streams but healthy floodplains that can deal with the watershed's hydrology.

Ecotone is able to work with many private landowners to come up with agreements on projects. Ecotone also works with a lot of folks who do grant-funded projects. Ecotone also does a lot of work in agricultural settings.

It's also important to consider the impacts of riparian forest threats like the Emerald Ash Borer, which is bringing down large swaths of trees.

Impacts of degraded streams on trout passage are also something that Ecotone considers. Bryan highlighted a project in New Jersey that aimed to remove blockages for trout.

Bryan raised the point that "young forests aren't bad"—many stream restoration projects are not affecting forest loss; rather, they are converting a mature forest to a young forest. This shouldn't be mistaken for advocating for clear-cutting, but there is not a lot of young forest in most of the

center/western portions of the state. Young forests are important habitat for certain species like golden-winged warblers and others.

Bryan presented a selection of successful stream restoration projects, including those with beaver populations.

Bryan also mentioned the importance of using the wood from any removed trees. If this wood cannot be used on-site for some reason, it can be used by people in the community (for example, artisan woodworkers creating live-edge tables).

Project Results Presentation

Chris Swann (CWP) – Policy/Document Review and Interviews
Policy/document review: The goal was to better understand the requirements of each state for protecting and mitigating damage to stream buffers associated with stream restoration projects. A total of 40 regulatory and 78 technical/guidance documents were reviewed.

Interviews: The goals were 1) to better understand how the requirements identified from the review of regulatory and policy documents are (or are not) implemented in each jurisdiction and 2) to identify and refine best practices to minimize adverse impacts to riparian forests. A total of 19 individuals were interviewed, representing state and local governments, as well as practitioners.

Chris provided an overview of how forests are defined for this project and the key federal policies reviewed. He also summarized the key findings and identified best practices related to site selection and planning, design and permitting, implementation, and post-construction monitoring.

The deliverable for this task was a technical memo that will be included in the final project report.

Jordan Fox (CWP) – Case Study Analysis
Reviewed 10 stream restoration projects in Lancaster County, PA, Anne Arundel County, MD, and Fairfax County, VA to determine the extent to which requirements are implemented and quantify the impacts stream restoration has on riparian vegetation.

Utilized loading rates from CAST to determine changes in nutrient and sediment loading from the stream restoration projects and impact to the riparian vegetation due to project implementation.

Jordan walked through 5 case study example projects and summarized the key findings.

Case study results were summarized in 3- to 5-page summaries for each site that will be included in the final project report.

Questions from the Policy Review & Interviews or Case Study Analysis presentations were addressed and/or discussed during the facilitated discussion.

Facilitated Discussion

Question from Anne Hairston-Strang: Are there trends for more designs with shading in mind for wetland complexes (stream temperature considerations)?

Response from Erik Michelsen: It's also important to consider how well these systems are able to handle flashy flows. In terms of temperature, while shading is certainly component, I think that we

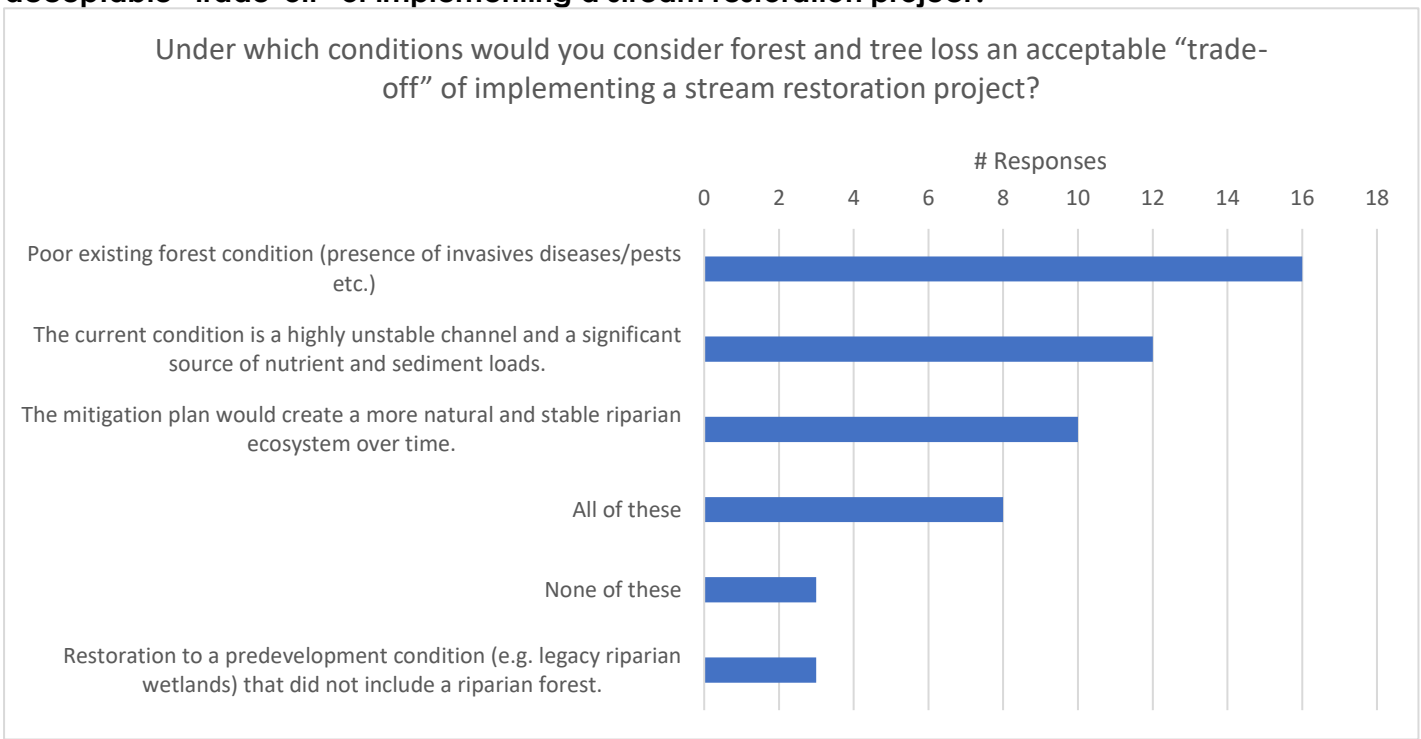
underestimate the value of restored groundwater hydrology on cooling these systems. I think a problem that we run into is that many of these systems are driven by stormwater with maybe a small trickle of groundwater-based flow.

The group discussed how micro-topography is considered and how that relates to temperature impacts in restored streams. In natural systems (including those with wetland complexes), you see a lot of topographic diversity within a site—for example, some sections of the stream may be open, and others may have islands and pools. Recreating this kind of micro-topographic diversity may be difficult from a maintenance perspective, but in terms of mimicking natural systems (specifically with the goal to recreate natural thermal regimes), it may be necessary. Erik Michelsen described the importance of creating a "mosaic" of microhabitats rather than an entirely uniform stream system. Anne Hairston-Strang elaborated further on the importance of temperature and its impacts on trout populations. While groundwater inputs are essential for maintaining trout habitat, shading those areas to maintain colder temperatures is also important. There appears to be unresolved discussion on whether groundwater inputs or in-stream shading are most important for maintaining temperatures suitable for trout populations.

In response to the case study analysis portion of the presentation, Denise Clearwater commented that forest and floodplain wetland areas are not mutually exclusive. Lisa Fraley-McNeal explained that we used the land use classifications from the 2013/2014 Chesapeake Conservancy dataset.

Greg Golden commented that it seems like 80% of concerns voiced by the public are in public areas where larger restoration/floodplain connections are proposed. Erik Michelsen commented that the public should be hearing about these projects way before permit applications get into the state's hands. The group discussed the importance of landowner engagement and public outreach/education.

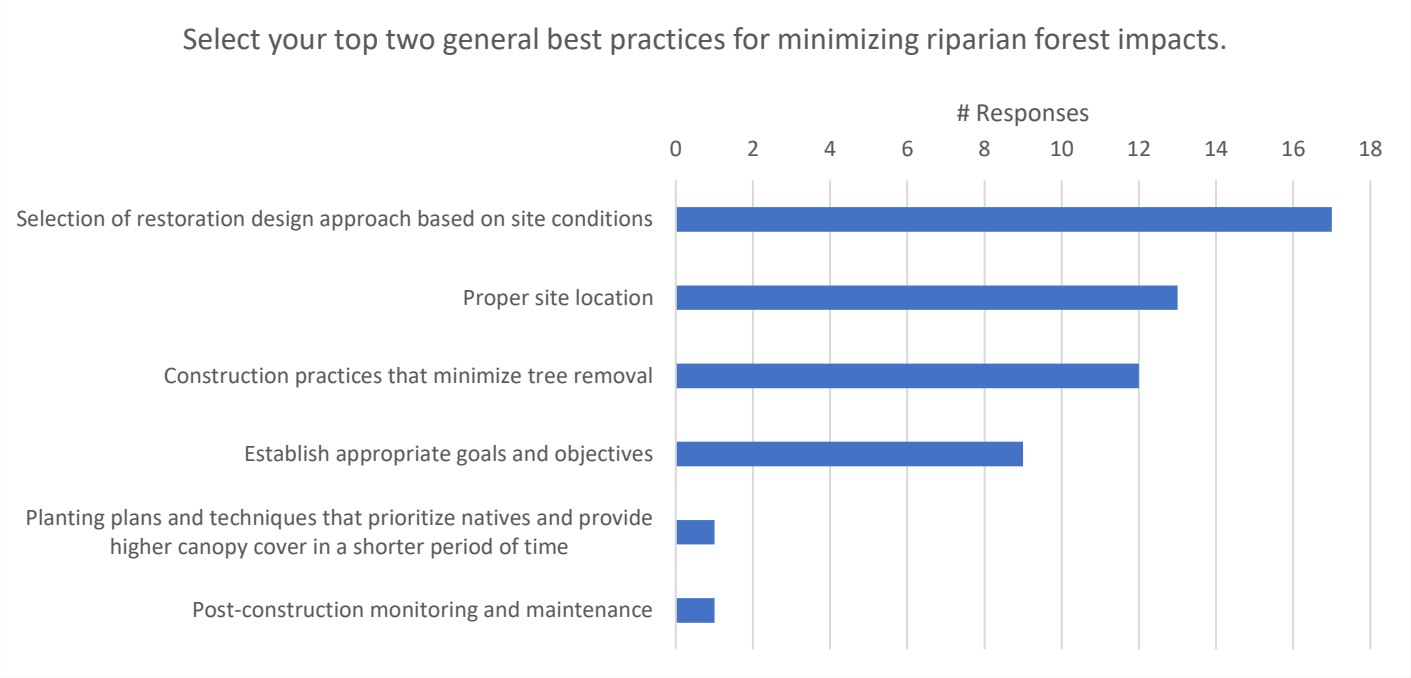
Discussion Question 1 – Under which conditions would you consider forest and tree loss an acceptable "trade-off" of implementing a stream restoration project?



The group discussed the poll results from the first facilitated discussion poll question, which showed that many consider poor existing forest condition to be a good reason to remove trees during restoration.

Tony Redman mentioned that he's not seeing much good documentation on the biological lift from stream restoration projects as they would like/need to see. The group discussed biological/functional uplift and water quality benefits (and, in some cases, decreased water quality) from stream restoration projects. In many cases, folks involved with stream restoration are focused on water quality solely from a TMDL crediting perspective, but the importance of also considering effects on habitats, regimes, and macrobiota was emphasized.

Discussion Question 2 – Select your top two general best practices for minimizing riparian forest impacts.



The group discussed the poll results from the second facilitated discussion poll question, which showed that many consider proper site selection and proper restoration type selection to be the best practices for minimizing riparian tree impacts. Aubin Maynard commented that site selection is not necessarily a choice in a lot of jurisdictions due to constraints from property ownership and utilities. A comment from the chat box indicated that post-construction monitoring and maintenance is often overlooked. Bryan Seipp mentioned performance-based contracting as well.

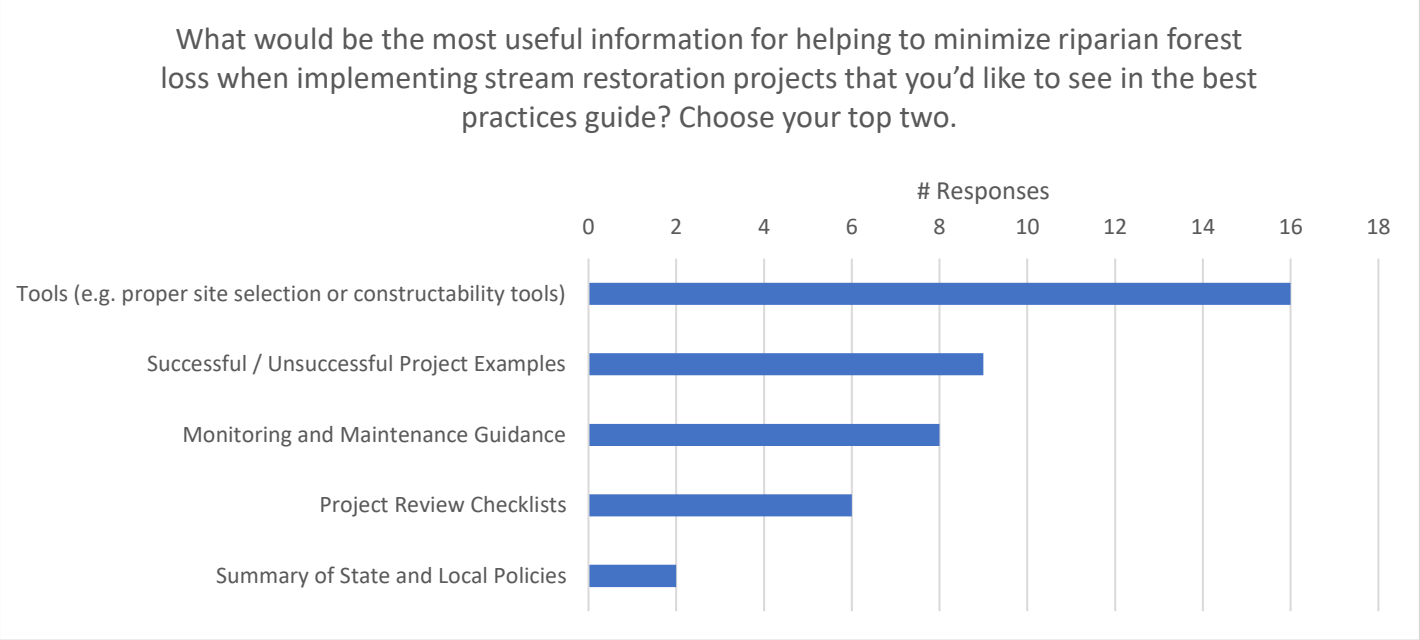
Discussion Question 3 – How should we take into consideration forest health decline that is occurring due to numerous factors (even without effects from stream restoration projects)? These factors include dominance by invasive and native vines, loss to invasive diseases/pests, competition from non-vine invasives, excess herbivory, and climatic-induced loss.

Bryan Seipp discussed how watershed hydrology and other regime-level characteristics can affect riparian forests/trees, and he mentioned threats from invasive insects and plants. The importance of maintenance was discussed.

Discussion Question 4 – How can monitoring efforts for riparian forests that are part of stream restoration mitigation plans be improved?

Erik Michelsen mentioned that remote-sensing tools (particularly some of the lidar and multi-spectral imaging) gives us an opportunity to look at changes in the plant community over time. These tools aren't that expensive and could be used on a broad scale. This, of course, is a supplement to on-the-ground examination, not a replacement for it. Meghan Fellows mentioned that one of the difficulties with monitoring programs is not having an agreed upon functional metric to define a healthy forest—green does not always mean good when looking at aerial imagery because of invasives. Douglas Griffith commented that developing regionally specific riparian monitoring protocols would be a start.

Discussion Question 5 – What would be the most useful information for helping to minimize riparian forest loss when implementing stream restoration projects that you'd like to see in the best practices guide?



The group discussed the poll results from the final facilitated discussion poll question about what the most useful information for would be for helping to minimize riparian forest loss during stream restoration projects (i.e., what do you want to see in the best practices guidance document?). Tools for proper site selection, followed by examples of successful and unsuccessful projects, followed by monitoring and maintenance guidance were the top three choices. Denise Clearwater added to the list specific performance standards and conditions since that was not a poll option.

Webcast Chat Log[3]

00:18:04 Chris Swann: Hi Everyone

00:53:47 Denise Clearwater: Lost audio will call in

01:20:12 Neely Law: Great presentation, Erik. This question is for Denise as well. Based on the research Erik presented on County projects and elsewhere by others, how do you define

[3] Note that the chat log was copied directly from the webcast and has not been edited for grammatical correctness.

historic or predevelopment conditions for setting vegetation restoration goals (forested vs scrub-shrub wetland)?

01:23:06 Bill Stack: Yes great presentation Erik and question Neely.

01:23:35 Denise Clearwater: Historic condition from hundreds of years ago does not play a major part in MDE's considerations. We evaluate based on how we value current conditions, among other requirements. Priority areas and their desirable characteristics are described in other State references, regulations, and goals.

01:25:09 Erik Michelsen: Neely. Thanks for the feedback. We're planting these system generally to function as forested wetlands with a mosaic of other, wetter, wetland types.

01:25:50 Erik Michelsen: As well as planting more upland species on the periphery, generally on the edges of the valleys.

01:37:48 Anne Hairston-Strang: Today's designs have to function with post-development hydrology and effects of rising temperatures. Stream temperatures are rising even more than air temperatures in many areas with changes in land use. Are there trends for more designs with shading in mind for the wetland complexes? And considering the watershed context for where other forest cover exists? Vigorous complaints are coming from areas where little other natural forest remains.

01:43:19 Greg Golden: Would like to ask a question based on where many concerns come from: urban / suburban forest corridors, publicly owned, where larger restoration or floodplain connections might be proposed. This seems to be where 80% of voiced concerns first get informed. I learn something each presentation, but the thought does come up, maybe we aren't going to the next step of analyzing and solving this concern, and potential solutions.

01:49:27 Denise Clearwater: I agree with Anne regarding temperatures-both shade and groundwater are important. Also, a riparian forest can still be a mosaic with microtopography, fine elevation changes, vernal pools, etc while still being shaded.

01:52:29 Erik Michelsen: Hey Greg,
01:53:32 Erik Michelsen: I know Lisa said she'll take your question up later, but I'll just say that the public should be hearing about these projects way before permit applications get into the State's hands. That's on the applicants.

02:03:21 Greg Golden: Good point Erik, I have been saying in the past couple months, there is always a landowner involved (or more than one), and some have larger interest groups, some have fewer. I know it's much more complex than that, but we are agreeing at this basic key starting point.

02:21:30 Denise Clearwater: "Forest" and "floodplain wetland" are not mutually exclusive areas. Tulip poplar are frequently found in floodplains, if not in very wet areas.

02:24:09 Alison Santoro: Denise, I agree. We need to differentiate between upland forest, forested wetlands, and emergent wetlands.

02:28:19 Denise Clearwater: There were other water quality impacts (e.g. lower DO) as a result of restoration in some early monitoring reports.

02:30:23 Meghan Fellows: Was there a change in NNI?

02:34:21 Jordan Fox (CWP): Hi Meghan -- for most of the case study locations, the post-construction monitoring indicated that non-native invasives were being adequately managed; although, they were observed at certain locations. Where that invasives monitoring data was present, those results are summarized in the case study memo.

02:38:04 Erik Michelsen: Groundwater DO at SERC increased after restoration, per the following presentation: https://cbtrust.org/wp-content/uploads/SERC-T.Jordan-RSC-Performance-6-29-18.pdf

02:53:31 Douglas Griffith: I'm not seeing the pop up box, but I'll use both of my two votes on F

02:56:41 Douglas Griffith: I'm having microphone issues - but the reason for my answer is that I feel it's an often overlooked facet of restoration. I've seen countless reforestation/planting efforts "fail" because of lack of post-construction/post-planting maintenance.

03:10:28 Douglas Griffith: I think developing regionally specific Riparian monitoring protocols would be a start, such as those that exist in the western states.

03:11:00 Douglas Griffith: As well as a regionally specific FQI

03:14:01 Anne Hairston-Strang: A forest health index from Vermont: index from indicator dashboard (https://www.uvm.edu/femc/indicators/vt)

03:14:41 Denise Clearwater: Specific performance standards and conditions

03:16:13 greg Golden:Adaptive Mgt is a very important tool, but how to optimize that.....is a whole conversation on its own. It is relatively early stages of optimizing for stream restoration

03:16:42 Erik Michelsen: Thanks

VA Webcast Summary

State Webcast Information

Virginia

May 18th, 2022

Agenda

Date/Time	Wednesday, May 18, 2022, 1:00 PM – 4:00 PM	
Webcast Recording Link	https://us06web.zoom.us/rec/share/27q0QY6U9OW6mX4RV9spb-4zxZ_w3S65fOxtA0E4-nYUxH8g40FNOZvY_ZLLE-sz.8xJwCDlV1IL_IbM2	
Link to PDF of slides	https://www.cwp.org/wp-content/uploads/2022/05/Maintaining-Forests-Webcast-Presentation-Virginia-final.pdf	
Time	**Agenda Item**	**Presenter**
1:00 PM – 1:20 PM	Welcome and Project Overview	Lisa Fraley-McNeal, CWP
1:20 PM – 2:20 PM	State Agency, Local Gov, and Practitioner presentations	Brock Reggi, VA DEQ
		Charles Smith, Fairfax County
		Josh Running, Stantec
2:20 PM – 2:25 PM	Break	
2:25 PM – 3:05 PM	Presentation of Maintaining Forests Project Results	Lisa Fraley-McNeal, CWP
		Chris Swann, CWP
		Alexandria Wilkins, CWP
3:05 PM – 3:10 PM	Break	
3:10 PM – 3:50 PM	Facilitated Discussion	Lisa Fraley-McNeal, CWP
3:50 PM – 4:00 PM	Wrap up and Next Steps	Lisa Fraley-McNeal, CWP

Presenters

Presenter	Biography
	**Brock Reggi, VA Department of Environmental Quality** Brock has over 22 years working in the stream industry. He graduated from West Virginia University with a BS in environmental science and a minor in microbiology. Prior to working for the VDEQ, Brock began as an intern at West Virginia University where he spent multiple summers assisting in stream restoration short courses. From there Brock worked two years in West Virginia working with stream mitigation in the mining industry. He then worked for approximately 13 years for Williamsburg Environmental Group now Stantec where he conducted stream assessments, designs, and construction oversight.

Presenter	Biography
	**Charles Smith, Fairfax County** Charles Smith grew up in Arlington, VA. He is a naturalist and ecologist with 30 years of experience in natural resource and wildlife inventory, planning, restoration, management and monitoring. He is currently a branch chief for Fairfax County's Stormwater Planning Division, focusing on stream and natural area restoration. Charles is a veteran of the United States Army, a board member of the Virginia Native Plant Society, a Certified Ecological Restoration Practitioner with the Society for Ecological Restoration and an instructor for Virginia Master Naturalists, Virginia Master Gardeners and the Audubon Society of Northern Virginia.
	**Josh Running, Stantec** Josh Running is the National Technical Lead for Ecosystems Restoration for Stantec. He has been working in consulting for over 22 years, 19 + focused on stream restoration and water quality. His experience spans multiple stream restoration techniques, with project locations throughout Virginia's varied geology. Josh has proficiency in designing projects in both rural and urban settings. He received his BS in Watershed Management from UW – Stevens Point and lives with his wife (Amanda) and two sons (Porter and Sullivan) in Williamsburg, VA.
	**Lisa Fraley-McNeal, Center for Watershed Protection, Inc.** Lisa is a Sr. Watershed & Stormwater Research Specialist for the Center. Lisa has been working on urban watershed and stormwater management since 2006. Her areas of expertise include GIS and field methods for watershed assessment, watershed planning, stream restoration, Chesapeake Bay TMDL crediting, and applied research on topics related to watersheds and stormwater. She has a B.S. degree in Geography and Environmental Systems, with a writing minor and cartography certificate from the University of Maryland, Baltimore County. Lisa also has a M.S. degree from the University of Maryland, Baltimore County in Marine and Estuarine Environmental Science.
	**Chris Swann, Center for Watershed Protection, Inc.** Chris is a Watershed Planner & Environmental Analyst for the Center. Chris has been a watershed planner at the Center since 1997. His work time is split between two responsibilities; researching and writing technical guidance on watershed management issues, and trying to keep the Center's technology in check and functioning properly. Since joining the Center, Chris has contributed in the writing of numerous Center publications, including the Urban Subwatershed Restoration Manual series and the Better Site Design Manual. Chris has a B.S. in Natural Resources Management from the University of Maryland, as well as a B.S. in Biology from James Madison University.

Presenter	Biography
	**Alexandria Wilkins, Center for Watershed Protection, Inc.** Alexandria is a Watershed Planner for the Center. A recent graduate with a Master of Environmental Science and Management (MESM) degree – specializing in water resource management – and a background in environmental stewardship and education, Alexandria contributes her knowledge and experience to support the Center's mission to protect and restore water resources. She brings skills in project management, geographic information systems (GIS), and data analysis to the team. In addition, she is interested in stakeholder engagement and the collaborative management of natural resources.

Registrants

Webcast Attendance
Total Number of Registrants: 46
Total Number of Webcast Attendees: 32

Name	Email Address	Webcast Attendance
Alexandria Wilkins	ajw@cwp.org	**Y**
Allie Wagner	awagner@novaregion.org	**N**
Bill Gillespie	bgillespie70@hotmail.com	**N**
Brock Reggi	brock.reggi@deq.virginia.gov	**Y**
Brooke Perrigo	brooke.perrigo@fairfaxcounty.gov	**N**
Caroline Johnson	johnson.caroline@epa.gov	**Y**
Carter Henderson	CarterHenderson9@gmail.com	**Y**
Cary Hulse	chulse@wetlands.com	**Y**
Charles Smith	Charles.Smith@fairfaxcounty.gov	**Y**
Chris Swann	cps@cwp.org	**Y**
Christin Jolicoeur	cjolicoeur@arlingtonva.us	**N**
Christopher Herrington	christopher.herrington@fairfaxcounty.gov	**N**
Daniel Habete	daniel.habete@fairfaxcounty.gov	**N**
Danielle Sette	danielle.sette@fairfaxcounty.gov	**N**
Doug Streaker	dstreaker@biohabitats.com	**Y**
Heather Ambrose	heather.ambrose@fairfaxcounty.gov	**Y**
Jason Papacosma	jpapacosma@arlingtonva.us	**Y**
Jenny Zhen	jenny.zhen@fairfaxcounty.gov	**Y**
Jill Sunderland	jsunderland@hrpdcva.gov	**N**
Joni Calmbacher	joni.calmbacher@fairfaxcounty.gov	**Y**
Jordan Fox	jf@cwp.org	**Y**
Josh Running	josh.running@stantec.com	**Y**
Katie Brownson	katherine.brownson@usda.gov	**N**
Katie Talley	ktalley@biohabitats.com	**Y**
Kenneth Bawer	kbawer@msn.com	**Y**
Kevin McLean	kevin.mclean@deq.virginia.gov	**Y**
Lily Whitesell	lwhitesell@arlingtonva.us	**N**
Lisa Fraley-McNeal	lfm@cwp.org	**Y**

Webcast Attendance Total Number of Registrants: 46 Total Number of Webcast Attendees: 32		
Name	**Email Address**	**Webcast Attendance**
Maria Izabel Martinez da Matta	maria.martinezdamatta@maryland.gov	**Y**
Mary Jacobs	Mary.jacobs@deq.Virginia.gov	**N**
Matt English	matthew.english@dc.gov	**Y**
Matt Meyers	matthew.meyers@fairfaxcounty.gov	**N**
Nathan Staley	nstaley@wetlands.com	**Y**
Neely Law	neely.law@fairfaxcounty.gov	**Y**
Pam Mason	mason@vims.edu	**N**
Paul Pitera	ppitera@res.us	**Y**
Rachael Holland	rachael.holland@fairfaxcounty.gov	**Y**
Rebecca Hanmer	rwhanmer@yahoo.com	**Y**
Rebecca Napier	rnapier@wetlands.com	**Y**
Rick Atkinson	ratkinson@res.us	**Y**
Russell Bailey	rrussell.bailey@gmail.com	**Y**
Shannon Bell	shannon.bell@fairfaxcounty.gov	**Y**
Suzanne Foster	suzanne.foster@fairfaxcounty.gov	**N**
Suzanne Trevena	trevena.suzanne@epa.gov	**Y**
Ty Asfaw	tasfaw@arlingtonva.us	**Y**
Vivian Bui	vivian.bui@fairfaxcounty.gov	**Y**

Summary of Key Discussion Points

In terms of monitoring and assessment, there are a lack of trained professionals that can conduct community classification and condition assessments. Additional funding was also recommended for monitoring budgets, and it was suggested that municipalities set aside 10% of project costs for monitoring and maintenance post-construction.

The community is concerned about habitat and viewshed disruption. Community inclusion is an important component of restoration and should be done early in the project process and often. The community should be involved in reviewing documents and assisting with decision-making.

Stream restoration projects can open space for invasive encroachment, with invasive species growth common in the first two years post-construction. Development of invasive species control plans using appropriate methods are an important part of maintenance (hand pulling or cutting, mechanical controls, prescribed fire, grazing/goats, and/or chemical applications).

There are many older developed areas that have minimal or no stormwater management. Despite looking back at the last 50 years with hindsight, practitioners and regulators are still catching up. Upland stormwater controls were questioned as a potential alternative option to conducting stream restoration projects that hasn't been properly explored. The difficulty with this approach alone is that that even if the stormwater flows are reduced, degradation to the stream systems has already occurred and will continue to occur. While retrofitting existing facilities can be beneficial, the area benefitted is often small and localized. Implementing enough stormwater controls at the watershed level to be effective is challenging and, depending on the watershed, it may not be feasible due to

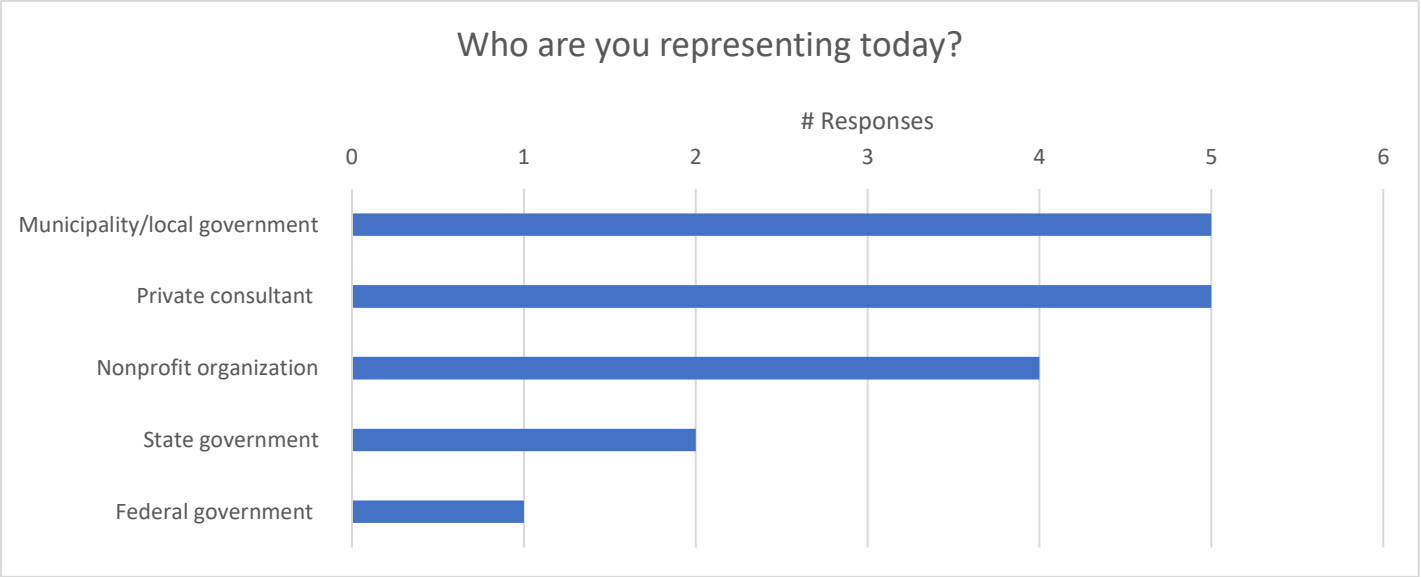
property ownership and enforcement concerns. A comprehensive review of the scientific and gray literature on this subject was recommended.

Meeting Notes

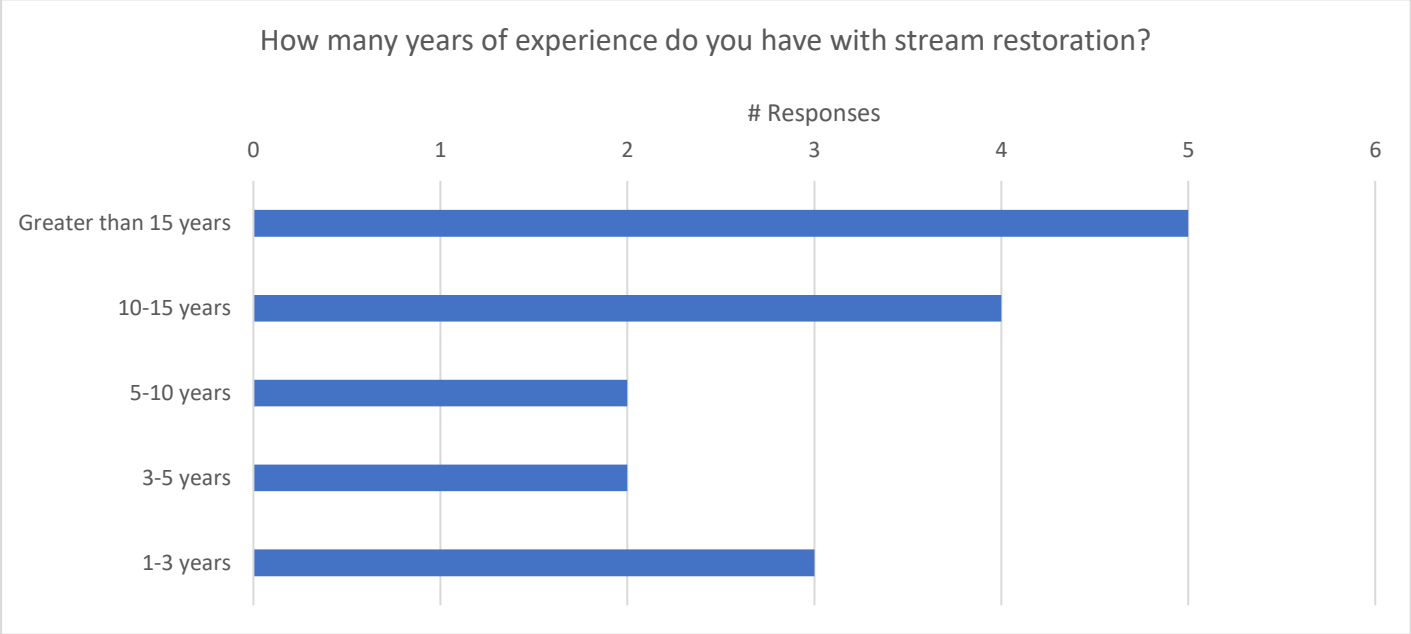
Welcome and Project Overview

Poll Question 1 – How many people are participating in the webcast today at your location?
All attendees joined individually.

Poll Question 2 – Who are you representing today?



Poll Question 3 – How many years of experience do you have with stream restoration?



Lisa Fraley-McNeal (CWP) – Overview of the Maintaining Forests in Stream Corridor Restoration and Sharing Lessons Learned Project

Given the concern over the potential negative impacts of stream restoration, CWP received a grant from the Chesapeake Bay Trust to evaluate how these unintended outcomes can be minimized in the riparian area, including forest buffers, to improve riparian and stream habitat quality.

A Stakeholder Team was formed to provide input and help guide the project.

Background Information

- The CBP Stream Restoration Expert Panel Crediting Protocols were finalized in 2014. The credits contributed as a driver for implementation of stream restoration projects. Other benefits and considerations of projects beyond nutrient and sediment load reduction were often lost.
- The updated CBP stream restoration protocols based on recent workgroup updates help to address stream health more comprehensively.
- With sediment being one of the main stressors of biological impairment, there is a regulatory incentive to address it. Stream restoration is being done to meet local TMDLs in addition to the Bay TMDL.
- The rapid increase in stream restoration projects throughout the Chesapeake Bay watershed has led to growing concern and controversy about their effects on whole-ecosystem health and services.
- One of the arguments against stream restoration is that we should be looking upstream to implement BMPs instead. However, some considerations of this approach are 1) that it can take years before an effective geomorphic change is identified due to changes in the flow regime, and 2) Implementing enough upstream BMPs to create a response at the watershed scale is often not feasible depending on the watershed conditions.

Completed project tasks include: 1) project planning and preparation, 2) QAPP, 3) policy/document review and interviews, and 4) case study analysis.

The webcast task is currently in progress and will be completed by 5/31/2022.

The next task is to synthesize results from the completed project tasks into a final project report that includes recommendations on opportunities to improve consideration of riparian forests in stream corridor restoration projects to minimize unintended consequences. Recommendations from the project report will be used to update and finalize a best practices guidance document for local governments.

State, Local Government, and Practitioner Presentations

Brock Reggi (VA DEQ) – Stream Restoration Buffers in Virginia

The most common types of stream restoration projects in Virginia are Natural Channel Design (NCD) and Regenerative Stormwater Conveyance (RSC).

VA DEQ (9VAC25-210-10) defines stream restoration as "…the process of converting an unstable, altered, or degraded stream corridor, including adjacent areas and floodplains, to its natural conditions."

- Dave Rosgen's NCD approach defines river restoration as restoring "the physical, chemical, and biological functions of the river [… and it] includes not only the river channel but also its

related components, including adjacent floodplains, flood prone areas […] wetlands, and associated riparian communities."

Brock described the four different priority types for stream restoration (developed by the North Carolina Stream Restoration Institute, 2003). The majority are Priority I Restoration (where the channel is raised and connected to the floodplain) and Priority II Restoration (where a new channel is created, and the floodplain is lowered). Priority III and IV Restoration are seen less often, and they involve creating a new channel under modified equilibrium and implementing bed/bank armoring, respectively.

- Big Rocky Run project (NCD wide buffer design; 2010)
- Paul Springs (NCD one-sided buffer; 2015)
- Pohick (NCD narrow buffer – 150 ft; most invasives but they were isolated; 2013)
- River Run (NCD below bankfull; 2019)
- James Terrace (RSC step-pool stormwater conveyance; 2016)

<u>Virginia's Perspective on Riparian Vegetation Changes</u>

- Recommended methods protocol for surveying pre-construction and identifying trees that should be saved
- Chesapeake Bay TMDL Special Condition Guidance – Section V.K. Outfall and Gully Stabilization
    - The goal is to maintain or improve existing native riparian vegetation to the maximum extent practicable.
- Virginia Water Protection (VWP) Permit Regulations
    - The goal is to promote no net loss of wetland acreage and function, as well as stream functions and water quality benefits.
- Mitigation Banking (9VAC25-210-116F2)
    - This is the final protective mechanism for the compensation of sites, including all surface waters and buffer areas.

The 404/401 mitigation requirement is 50 to 100 feet of riparian buffer in mitigation. Additionally, the seed source must be free of invasives. Forested conditions are not necessarily required since emergent or scrub-shrub vegetation may be appropriate for some project sites.

Successful projects are first-and-foremost those that meet their monitoring requirements. When performance standards are met, site visits are conducted, as-builts are created, and compliance inspections are passed, then a project site is considered successful. Some specific projects that are considered successful are:

- NCD VARTF site (Goose Creek, 2007)
- Less than Bankfull Nutrient Bank (Mossy Creek, 2018)
- NCD (Snakeden)
- RSC (James Terrace)

In terms of best practices, nothing is explicitly documented at the state level. Recommendations from the stream restoration crediting protocols are the best sources. The following are also helpful resources:

- Riparian Buffers Guidance Manual
- Mitigation Banking Selection Criteria Guidance
- County-specific guidance

Charles Smith (Fairfax County) – Maintaining Forests in Stream Corridor Restoration
We are focused on urban stream systems with a low level of retention that causes significant outflows and stream erosion. Ability to address problems at the source is limited.

The biggest threats to natural communities and streams are land conversion and fragmentation (and associated runoff from impervious surfaces), invasive species, deer herbivory, climate change, and compound effects like the urban heat island effect.

Fairfax County is largely residential and 80% of streams are impaired. They have mostly achieved their Chesapeake Bay Crediting goals and are now focusing on TMDL goals.

Regulations & Permit Requirements

- Clean Water Act (CWA) Sections 401 (state) and 404 (federal)
- Chesapeake Bay Preservation Ordinance requires protection/restoration of Resource Protection Areas (RPAs)and regulates impacts to vegetation. This may not apply to localities without tidal waters.
- Stormwater ordinances are required in all VA localities.
- VA Marine Resources Commission
- Local Stormwater and Land Disturbance
- VW DEQ General Discharge Permit
- VDOT Land Use Permit

Project drivers in Fairfax County are permit compliance, flood control/conveyance, stability/erosion, functional lift, aquatic biological impairment, and pollution prevention.

Tree loss and impacts to terrestrial systems are two of the most commonly raised concerns about stream restoration (based on data or perception). There are also concerns about stability/erosion, appropriate methodology, restoration planting and invasives control, wildlife impacts, cost, need for the project, influence of industry, questions on benefits, and not controlling the source.

Project selection is based on watershed plans, recommendations from staff and residents, desktop and field review, project ranking (access, land ownership, etc.) – merit and funding availability make the final decision.

Trying to move towards Priority 1 Restoration, but primarily involved in Priority III Restoration projects. Priority 4 Restoration is traditionally seen as armoring the stream banks, but that's not always the case.

The paradigm of stream restoration started with Lane's Balance Equation (1955), and it evolved to the Stream Function Pyramid (2012) and further evolved to the Stream Evolution Triangle (2019). Varying parameters determine what dominates the system.

- Refers to any NCD, RSC, LSR or other restoration project that meets the qualifying conditions for credits, including environmental limitations and stream functional improvement.

The following are important for restoration planning in Fairfax County:

- Expressing the "why" of the restoration
- Drafting an ecological description of the site
- Establishing clear and measurable goals and objectives, as well as performance standards and accompanying monitoring protocols to evaluate project success
- Having plans/schedules/budgets for site prep/restoration/monitoring/adaptive management

- Having strategies for long-term protection and maintenance

Old Courthouse Spring Branch – Tysons Corner

Below the project area, there was a stable system, but at the lower end of the project area, there was degraded forest on one side and stable forest on the other side of the stream channel.

- Riparian Corridor Vegetative Community Assessment (community type classification as a departure from a reference condition)
- Projects should target fair or poor-quality vegetative communities and avoid good or excellent quality communities.
- Not many are trained to conduct community classification and condition assessments well

Stream buffer forest systems in poor or fair conditions (examples shown from photos); plantings were not planned or maintained to support the growth/development of a multi-tier forest system – there are likely other considerations as well.

Community inclusion is also important. There should be early and frequent communication with the community, and members of the public should be on the team to review documents and assist with decision-making.

Importance of community inventory (vegetative community mapping), creating a resource map to guide decisions based on what is important to the community to assist in determining where to avoid impacts, and designing based on function.

The Fairfax County Recovery Wheel tool is used to establish goals, target project potential based on site conditions, ensure goals reflect stakeholder values, create metrics to measure outcomes, and track progress.

Restoration Design and Implementation

- Importance of plant selection – use locally common plants, plant palettes by community type, plant size, quality, and source
- Nucleation – woody plants grow better when clustered together; this has shown increased plant survival.
- Deer browse is the major limiting factor after human impacts, so there is the need to plant with deer in mind by using pot stock rather than seedlings to discourage deer browse.

Development of invasive species control plans using appropriate methods (hand pulling or cutting, mechanical controls, prescribed fire, grazing/goats, and/or chemical applications)

They have three distinct monitoring programs:

1. Basic (Determine if site is stable/performing – once every 5 years, if not more)
2. Warranty (Identify needed remediation – once or twice)
3. Ecosystem (Determine system functions/trajectory – 2 to 3 times over 10 years)

Stream maintenance and condition score cards are used during basic monitoring to track whether the system is performing or not—this prompts further investigation as necessary.

Warranty monitoring for plant survival and contractual requirements has shown an increase in plant survival overall. Monitoring = better success!

Ecosystem monitoring using the "plot method" looks at the effect on the ecosystem, the condition of the ecosystem before construction/restoration, a reference ecosystem, post-restoration, and multi-year recovery.

Other types of monitoring include: Functional Ecosystem Recovery and Microbial Community Assessment.

Necessary Improvements

- More qualified staff to conduct natural community mapping and condition assessment
- To include funding for monitoring in project budgets
- Education of designers and managers
- Adding ecology to the design process

Josh Running (Stantec) – Practitioner Presentation

Community Concerns

- No one wants to remove a mature tree; it's not an inexpensive task.
- The community is concerned about habitat loss and viewshed disruption.
- Additionally, stream restoration projects can open up space for encroachment from non-native invasive species.
- There is an overall lack of communication with the community.
- Design considerations are not often explained to the community effectively.
- Best engineering and best natural design principles come together to create the best project design.
- Designs should be right on the "edge-of-failure." - Making sure projects can be successful, but also taking into consideration that there is an intricate balance between incorporating natural design/processes versus incorporating access and safety into the design.

Stream Restoration Evolution

- In the past, there was more of an emphasis on short-term stabilization and a lack of stream geomorphic knowledge, which resulted in unnatural riffle-pool sequences and structure placements.
- Today, practitioners have access to an abundance of resources, references, and experiences. Today's stream restoration projects typically use of multiple techniques and materials, provide better access to the floodplain, and they increase the emphasis on water quality, habitat, and long-term stabilization.
- For the future, climate change adaptation is important. There is an estimated 20% increase in storm intensity predicted over the next 20 years. We need to factor this into project design and model multiple scenarios to ensure projects are resilient.
- DEQ Flooding Resiliency Grant

Types of Projects

- Variables that impact project types are:
    - Project goals and objectives (404/404, mitigation bank, TMDL, habitat, infrastructure protection, etc.)
    - Project outcomes (flooding, habitat, green space, education and outreach, water quality)
    - Project location (urban vs. rural, confined vs. open)

Riparian Vegetative Changes

- The vegetation does take a hit after restoration, but if done right, it will come back. How long does it take? Post-construction planting plans are important, and it is a long-term consideration dependent on soil quality, climate, sun exposure, etc.
- Typically, it takes around 10 years to see the multi-tier community developing if the deer browse is low.
- Invasive species growth is common during the first 2 years post-construction.
- Municipalities should set aside 10% of project costs for monitoring and maintenance post-construction

Elements of a Successful Project

- Meets project goals and objective
- Provides additional benefits
- Approved by the client and community
- Ensures long-term success

Project Results Presentation

Chris Swann (CWP) – Policy/Document Review and Interviews

Policy/document review: The goal was to better understand the requirements of each state for protecting and mitigating damage to stream buffers associated with stream restoration projects. A total of 40 regulatory and 78 technical/guidance documents were reviewed.

Interviews: The goals were 1) to better understand how the requirements identified from the review of regulatory and policy documents are (or are not) implemented in each jurisdiction and 2) to identify and refine best practices to minimize adverse impacts to riparian forests. A total of 19 individuals were interviewed, representing state and local governments, as well as practitioners.

Chris provided an overview of how forests are defined for this project and the key federal policies reviewed. He also summarized the key findings and identified best practices related to site selection and planning, design and permitting, implementation, and post-construction monitoring.

The deliverable for this task was a technical memo that will be included in the final project report.

Alexandria Wilkins (CWP) – Case Study Analysis

Reviewed 10 stream restoration projects in Lancaster County, PA, Anne Arundel County, MD, and Fairfax County, VA to determine the extent to which requirements are implemented and quantify the impacts stream restoration has on riparian vegetation.

Utilized loading rates from CAST to determine changes in nutrient and sediment loading from the stream restoration projects and impact to the riparian vegetation due to project implementation.

Alexandria walked through 5 case study example projects and summarized the key findings.

Case study results were summarized in 3- to 5-page summaries for each site that will be included in the final project reports.

No questions for the Policy Review & Interviews or Case Study Analysis presentations.

Facilitated Discussion

Kenneth Bawer – These discussions are based on the false premise that a "stream restoration" should and will be done, and now how do we save a few trees. The better discussion should be

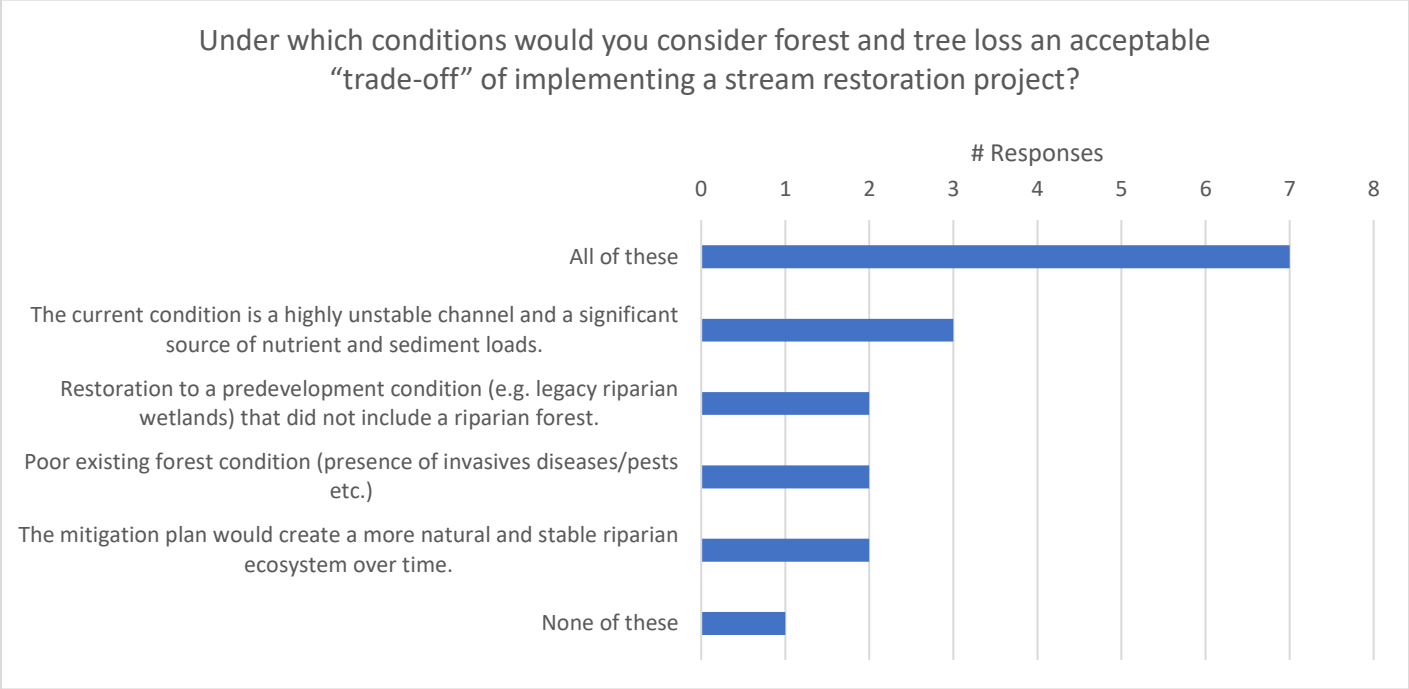
why are these "stream restorations" even done rather than upland stormwater control to fix the source of the problem. The excuse that you just can't do upland control is always arm-wavey and never proven.

Bill Stack – Stream restoration should be done when stream bank erosion is a major stressor to aquatic life. It is often a stop-gap measure to restore some function to the stream while watershed controls are being implemented which in many watersheds can take years for enough watershed controls to be installed to restore the flow regime.

Rebecca Hanmer - Is any water quality evaluation performed pre- and post-construction for parameters relevant to local aquatic life like dissolved oxygen, temperature and not just the Bay pollutant loads TN, TP and TSS?

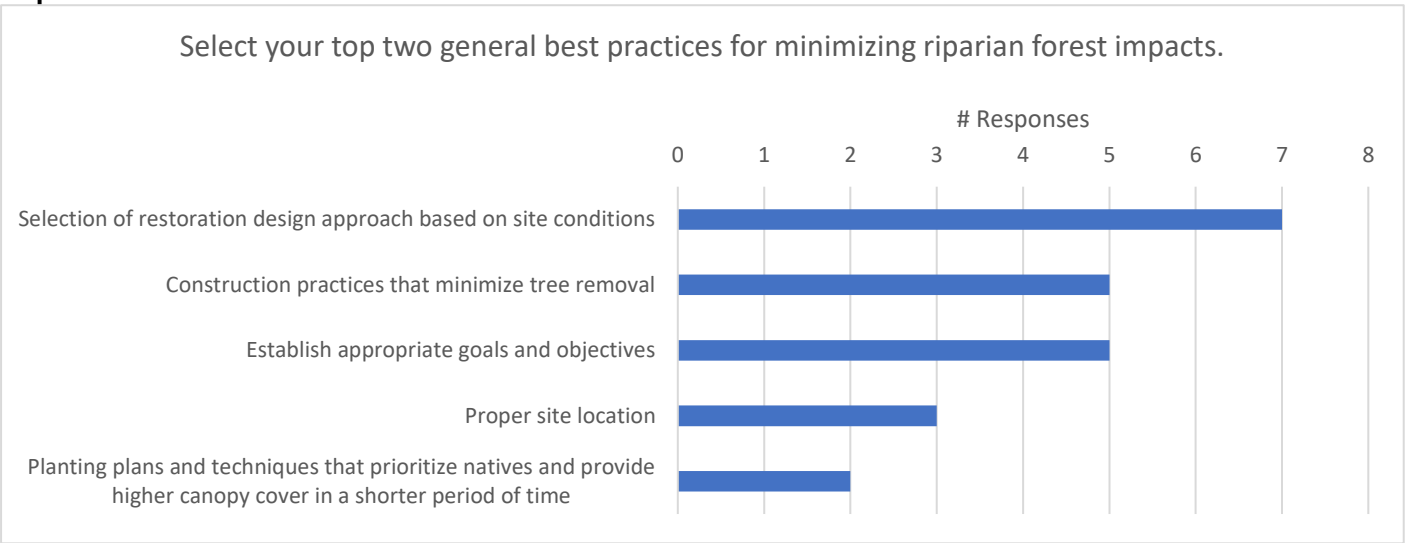
Response (Josh) – Isco samplers were set up in James City County where 5 stream restoration projects are going to be implemented to evaluate sediment loading rate and other constituents pre- and pos-restoration.

Discussion Question 1 – Under which conditions would you consider forest and tree loss an acceptable "trade-off" of implementing a stream restoration project?



Rebecca Hanmer noted that the design of the question asked about the reasons for tree loss that led almost everyone to vote for "all of the above". The way the question was posed would inevitably generate that answer, given the list of reasons why trees might be taken down in one project or another. Aren't all those reasons why trees might have to be removed a question of nuance? Is there anything in the project requirements that would require extreme prudence in removing the trees even if conditions exist that could be used as an excuse? It's going to be a judgment call. Unless there is a natural habitat reason to remove the trees, then all other removals need to be compensated in some way.

Discussion Question 2 – Select your top two general best practices for minimizing riparian forest impacts.



Discussion Question 3 – How should we take into consideration forest health decline that is occurring due to numerous factors (even without effects from stream restoration projects)? These factors include dominance by invasive and native vines, loss to invasive diseases/pests, competition from non-vine invasives, excess herbivory, and climatic-induced loss.

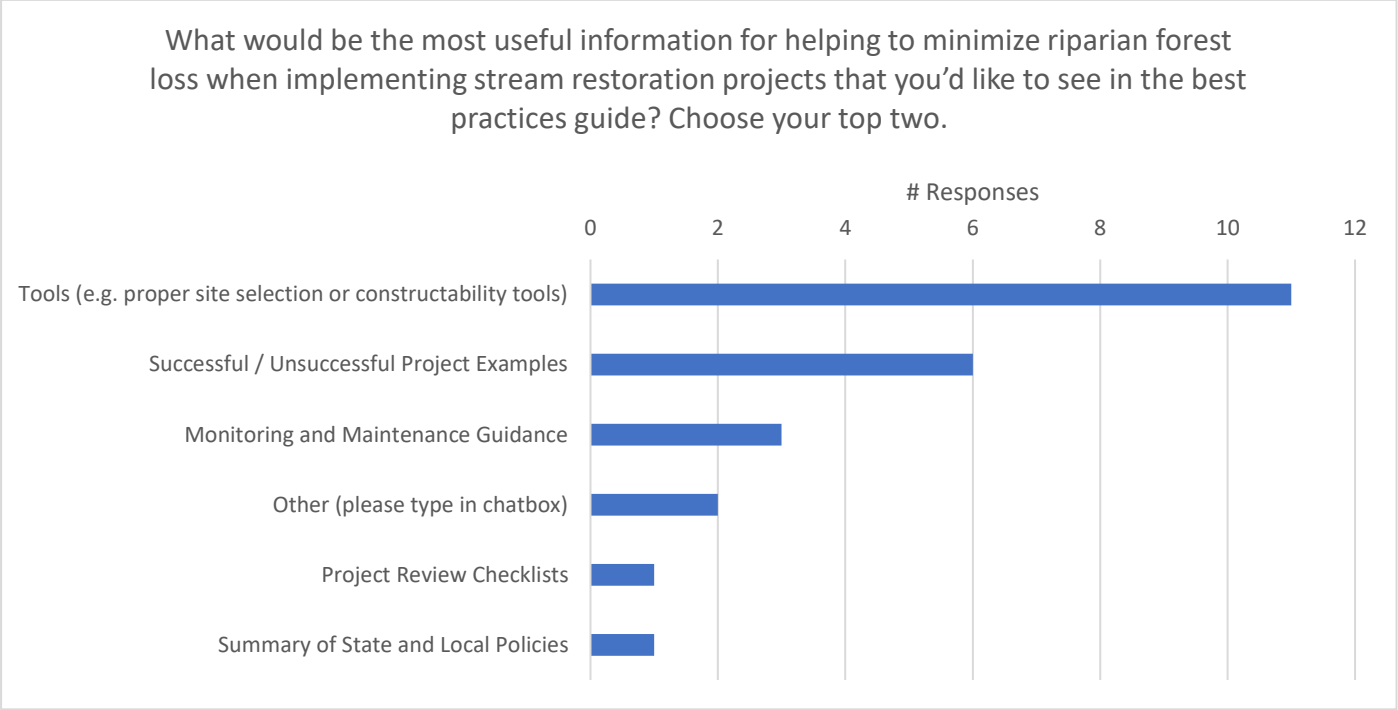
Josh – A lot can be done in terms of maintaining projects. Invasives can be dealt with by physical or chemical means; deer population control methods can be effective.

Charles – Watershed scale question; the significant fragmentation of natural areas; something that has to be addressed at the watershed scale more; Trying to expand urban tree canopy on private lands as well as public to address heat island effects; It goes back to that assessment of the community (good, fair, poor, etc.); looked at both the watershed and project scale.

Discussion Question 4 – How can monitoring efforts for riparian forests that are part of stream restoration mitigation plans be improved?

Charles – Programmatic and funding challenges. Within localities, there is a need for long-term programs with appropriate funding to keep trained staff available. Periodic monitoring to see if its functioning is important; canopy closure by simple survey or using aerial imagery remotely could be helpful as well.

Discussion Question 5 – What would be the most useful information for helping to minimize riparian forest loss when implementing stream restoration projects that you'd like to see in the best practices guide?



Other Responses

Charles - Site level community mapping and condition assessment is the best method of determining where higher quality resources are that should be avoided and lower quality resources that could benefit from restoration.

Ken Bawer – To minimize forest loss is not to do the stream restoration. Should it be done compared to upland control

Josh – There are a lot of issues; moving from one subwatershed to another but what happens to the subwatershed that's not being treated. The concern is the drive on the CB if you control the stormwater coming in it will reduce the degradation, but it is already happening and will continue. Additionally, upland is often privately-owned and you run into many issues there.

Kenneth – private land ownership is a key comment, I'm not naïve to think that it is easy or cheap but what do we do about the private land? Take the money for stream restoration projects and tell owners that they will put a bioretention or a rain garden on their land for free.

Josh – we are currently trying to mitigate the sins of the past

Brock – One size fits all; a lot more effort needs to put into regulating the releases to the streams especially on the soil and substrate types. Putting thought into the design of outfalls

Charles – retrofit of existing facilities which can be beneficial but is often small and localized. But we are looking at the large scale, we can't go back and force retrofit private properties. Right now we depend on redevelopment. Facilities that seem to work best were localized ponds that we have gotten away from. It's a really hard thing to address.

Josh – we really need to take into account the channel substrate and its ability to mobilize

Charles – everyone recognizes the intensity of flows is increasing and there's been a massive increase in flooding. The balancing act in long-term budgeting between safety and environmental degradation.

Kenneth – We're asking out natural areas to bear the brunt to fix the sins of our allowing over development without adequate stormwater control. We're sacrificing out local ecosystems and local areas to save the Bay. Not enough mindpower has been spent to try to figure out upland stormwater control. Pictures he's seen in this presentation would never look natural; it's a red herring. What was the environmental damage done to the original ecosystem? It's disingenuous.

Charles – we need to be better about describing the systems and the functions they perform to better inform the decision about whether the project gets done and what it needs to be restored back to. It should be based on a functions-based analysis.

Rebecca – Fredericksburg project and development in the next 10 years. How is upstream development taken into account for downstream restoration projects?

Charles – there is the responsibility of the design consultant to anticipate changes in that watershed. If it's a new development, permit requirements are likely to cause less of an impact than developments from the past.

Josh – MS19, water must be released from new developments at the same rate of the current/ pre-development land use. We are looking back at the last 50 years with hindsight and we are grappling with it. The reality is that we can do better and this is where we sit now. We are still catching up.

Brock – Reviewing plan sets, its increasingly obvious the amount of wood incorporated into projects. There's a lot of loss that's still yet to come and that's what the stream restoration is meant to avoid. There's more of a trend toward a more natural system at project completion than there was in the past

Kenneth – Can Lisa speak a bit more about the project in Carroll County? Of future plans?

Lisa – That study was wrapped up in the past 2 years. It was focused in the headwaters and involved sand filter retrofits of older ponds to reduce stormwater runoff. We did see a positive response in hydrology as a statistically significant result between pre- and post- treatment, including reduced flow and flashiness. Geomorphic indicators were trending toward stability but not with any significance in the limited amount of post-construction monitoring time included in the project. Most of the drainage area was treated by the sand-filter retrofits, but its not directly transferable because you'd have to find a way to treat the majority of the drainage area in a larger watershed which may not be feasible. We've applied for grant funding to continue monitoring and Carroll County may continue monitoring on their own.

Brock – VA is also open for questions, concerns, and comments. He is always looking for ways to improve. It's valuable to have more insight.

Charles – The industry is data driven if we get more tools and better tools over time that are data driven, they will be used especially if they are lower impact and lower cost.

Charles – VA is the same way. The updated priority 1 is more based on empirical data which will hopefully prove that we are helping with those sediment and nutrient reductions.

Kenneth – How the states allocate MS4 credits. In MD there is a huge emphasis on stream restoration vs upland projects. So I would argue that that is an artificial tipping of the scales.

Webcast Chat Log[4]

00:37:06 Chris Swann: Hi Everyone
00:39:35 Carter Henderson: B
00:39:47 Doug Streaker: D
00:40:27 Doug Streaker: F
02:22:30 Kenneth Bawer: These discussions are based on the false premise that a "stream restoration" should and will be done, and now how do we save a few trees. The better discussion should be why are these "stream restorations" even done rather than upland stormwater control to fix the source of the problem. The excuse that you just can't do upland control is always arm-wavey and never proven.

02:32:45 Bill Stack: Stream restoration should be done when stream bank erosion is a major stressor to aquatic life. It is often a stop-gap measure to restore some function to the stream while watershed controls are being implemented which in many watersheds can take years for enough watershed controls to be installed to restore the flow regime.

02:34:37 Kenneth Bawer: The science shows that "stream restorations" rarely if ever result in biological uplift (see Hilderbrand, Palmer, etc.)

02:45:08 Josh Running: We do a lot of retrofits and improvements related to stormwater facilities. Issues related to who owns the facilities are problematic...often controlled by an LLC that went out of exitance decades ago. Enforcement is a problem given the stormwater guidelines have advanced over time, as many communities are grandfathered. We have worked on purchasing homes and using the area (s) for treatment. However, not everyone likes using eminent domain or being forced to move in order to take houses and buildings to make SW facilities. Agree that stormwater treatment are important for instream WQ and mitigation against poor performing SW networks.

02:47:47 Rebecca Hanmer: Is any water quality evaluation performed pre- and post-construction for parameters relevant to local aquatic life like dissolved oxygen, temperature and not just the Bay pollutant loads TN, TP and TSS?

02:48:07 Bill Stack: I think there should be a comprehensive review of the scientific and gray literature on this subject. I have observed improvements in Baltimore City Steams while I was working there. However, stream restoration can stop the unzippering of streams and the transport of sediments to receiving waters. Hopefully, the implementation of a comprehensive watershed plan will be done concurrently but I know from experience how long this can take especially in a built environment.

[4] Note that the chat log was copied directly from the webcast and has not been edited for grammatical correctness.

02:48:41 Jason Papacosma: Right, @Bill Stack. We also think about it as a 'both and' dynamic. Work in the upland and creating resiliency in the stream valley. Time and space constrain the delivery of the former and costs of inaction (infrastructure risk, erosion, environmental impacts) require the latter. But both are needed.

02:54:01 Kenneth Bawer: Every vendor and government official says we have space constraints, but they never prove it. Plus, if a subwatershed has upland constraints, you can do the upland control in a different subwatershed to meet the MS4 Permit.

03:04:03 Charles Smith: Site level community mapping and condition assessment is the best method of determining where higher quality resources are that should be avoided and lower quality resources that could benefit from restoration.

03:33:34 Jason Papacosma: Well done speakers and good discussion. Thanks.
03:34:03 Suzanne Trevena: Can you put the link in the chat for the evaluation?
03:34:59 Chris Swann: https://lp.constantcontactpages.com/sv/T6klneS

Webcast Survey Report

Constant Contact Survey Results

Campaign Name: Maintaining Forests Webcast Survey May 2022

Survey Starts: 48

Survey Submits: 13

Export Date: 05/24/2022 08:07 AM

OPEN QUESTION

Name (optional)

greg golden
Charity Burkhart
Erik Michelsen
test
4 Response(s)

MULTIPLE CHOICE

1. Which state webcast did you attend?

Answer Choice	0% 100%	Number of Responses	Responses Ratio
Pennsylvania		2	15%
Maryland		10	76%
Virginia		1	7%
	Total Responses	**13**	**100%**

MULTIPLE CHOICE

2. Please identify the type of organization with which you work.

Answer Choice	0% 100%	Number of Responses	Responses Ratio
Federal government		1	7%
State government		5	38%
Local government (MS4)		4	30%
Local government (non-MS4)		0	0%
NGO		2	15%
Consultant		1	7%
No response		0	0%
Other		0	0%
	Total Responses	**13**	**100%**

NUMERIC SCALE

3. Please rate your overall satisfaction with the webcast.

Answer Choice	0% 100%	Number of Responses	Responses Ratio
1 (Very Unsatisfied)		0	0%
2		0	0%
3		2	15%
4		4	30%
5 (Very Satisfied)		7	53%
Mean	4.38		
Median	5.00		
	Total Responses	**13**	**100%**

MULTIPLE CHOICE

4. Please rate the material covered in the Introduction presentation

Answer Choice	0% 100%	Number of Responses	Responses Ratio
Excellent		6	46%
Good		6	46%
Average		1	7%
Poor		0	0%
No opinion		0	0%
Other		0	0%
	Total Responses	**13**	**100%**

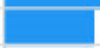
MULTIPLE CHOICE

5. Please rate the material covered in the State govt., local govt., and practitioner presentations

Answer Choice	0% 100%	Number of Responses	Responses Ratio
Excellent		5	38%
Good		7	53%
Average		1	7%
Poor		0	0%
No opinion		0	0%
Other		0	0%
	Total Responses	**13**	**100%**

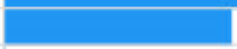
MULTIPLE CHOICE

6. Please rate the material covered in the Project Results presentation

Answer Choice	0% 100%	Number of Responses	Responses Ratio
Excellent		5	38%
Good		5	38%
Average		2	15%
Poor		0	0%
No opinion		1	7%
Other		0	0%
	Total Responses	**13**	**100%**

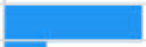
MULTIPLE CHOICE

7. Please rate the material covered in the Facilitated Discussion portion of the webcast

Answer Choice	0% 100%	Number of Responses	Responses Ratio
Excellent		8	61%
Good		5	38%
Average		0	0%
Poor		0	0%
No opinion		0	0%
Other		0	0%
	Total Responses	**13**	**100%**

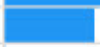
MULTIPLE CHOICE

8. This 3-hour webcast was the right length?

Answer Choice	0% 100%	Number of Responses	Responses Ratio
Agree		9	69%
Too short		0	0%
Too long		3	23%
No opinion		1	7%
	Total Responses	**13**	**100%**

MULTIPLE CHOICE

9. Would you recommend this webcast to colleagues and coworkers?

Answer Choice	0% 100%	Number of Responses	Responses Ratio
Yes		11	84%
Only for some parts		2	15%
No		0	0%
Maybe		0	0%
No opinion		0	0%
	Total Responses	**13**	**100%**

OPEN QUESTION

10. What did you enjoy most about the webcast?

presentation of info and then ample time to discuss and bring up individual perspectives and ideas.
The project results and case studies portion.
The discussion was the most useful portion of the webcast. The rest was just advertising set in concrete positions for stream rehabilitation or that it needs to be more focused and better site selection to achieve goals.
test
6 Response(s)

OPEN QUESTION

11. What would you improve about the webcast?

I wouldn't call it improvement ideas because I think everything worked out fine. Follow up & next steps along the long journey is always needed in this topic. That can't always be done in the same call; thought process evolution & future discussions
3 hours is a little bit long with few breaks
Include NGO, landowner, and concerned citizen groups in the presentations.
test
5 Response(s)

OPEN QUESTION

12. Was there any information or topics you were hoping to see discussed that were not included?

I viewed it as pretty comprehensive. I thought the light amount of meeting moderating is a good idea, and was well done. Future discussions, same venue or different, can build on such discussions. Additional level of detail can always develop.
No
Site selection: how, why, where, key drivers was glossed over but it is the key. Also, no discussion of a more holistic approach that includes upland treatments before getting to stream rehabilitation and what can be done in more urban settings.
4 Response(s)

MULTIPLE CHOICE

13. Would you like to see additional webcasts on this topic in the future?

Answer Choice	0% 100%	Number of Responses	Responses Ratio
Yes		9	90%
No		0	0%
Maybe		1	10%
	Total Responses	**10**	**100%**

OPEN QUESTION

14. Any additional comments?

As above, a very useful mtg & some of these restoration related meetings & initiatives do seem to develop step by step. This was a productive meeting, I'm not saying it owes anything beyond its own goal;the topical discussion develops/evolves as well
Include a consultant and a citizen group representative that advocate for a more holistic approach that includes first addressing quantity and quality control in the uplands for all sites - urban, suburban and rural.
It was nice to have this as a webcast instead of in person. It makes it easier to attend.
3 Response(s)