Maintaining Forests in Stream Corridor Restoration

NATIONAL STREAM RESTORATION CONFERENCE

Lisa Fraley-McNeal

Session A

8/22/2023

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement CB96374201 to the Chesapeake Bay Trust. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

Agenda

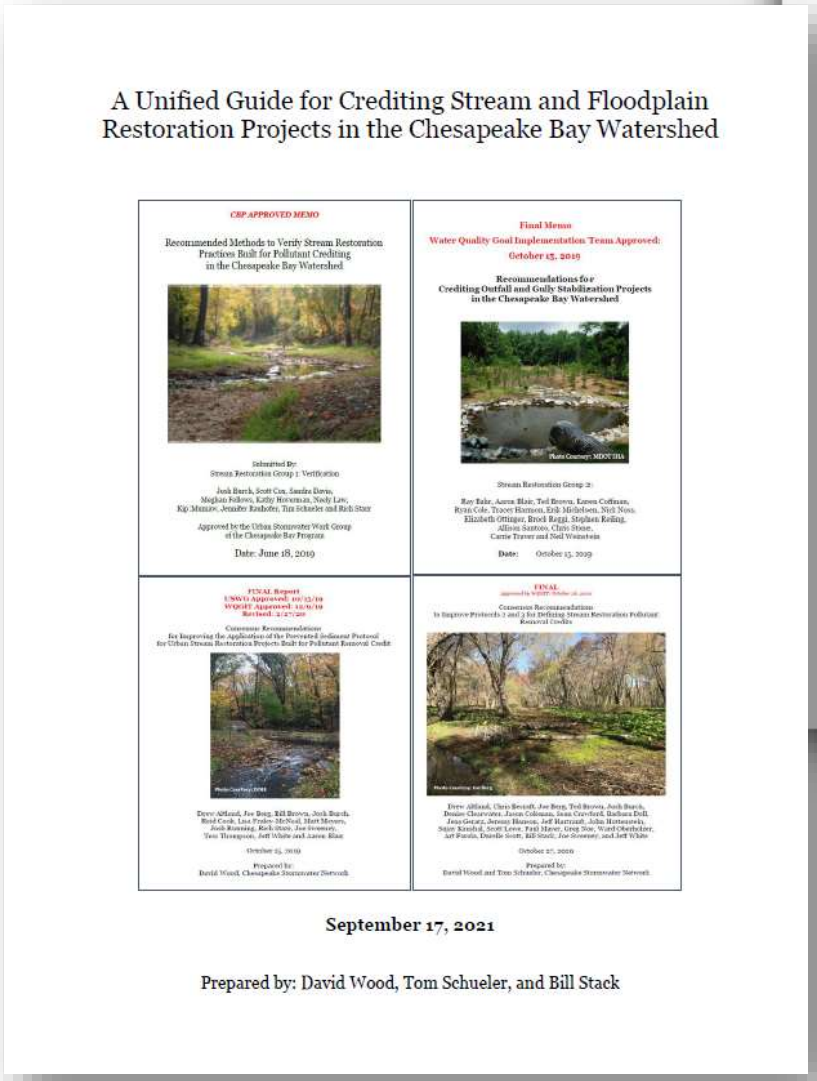
1. Project Overview
2. Summary of Findings and Recommendations
3. Next Steps

CBP Stream Restoration Crediting Protocols

- Credits contributed as a driver for implementation of stream restoration projects.
- Often, other benefits and consideration of projects beyond nutrient and sediment load reduction were lost.
- The updated protocols help to address stream health more comprehensively.

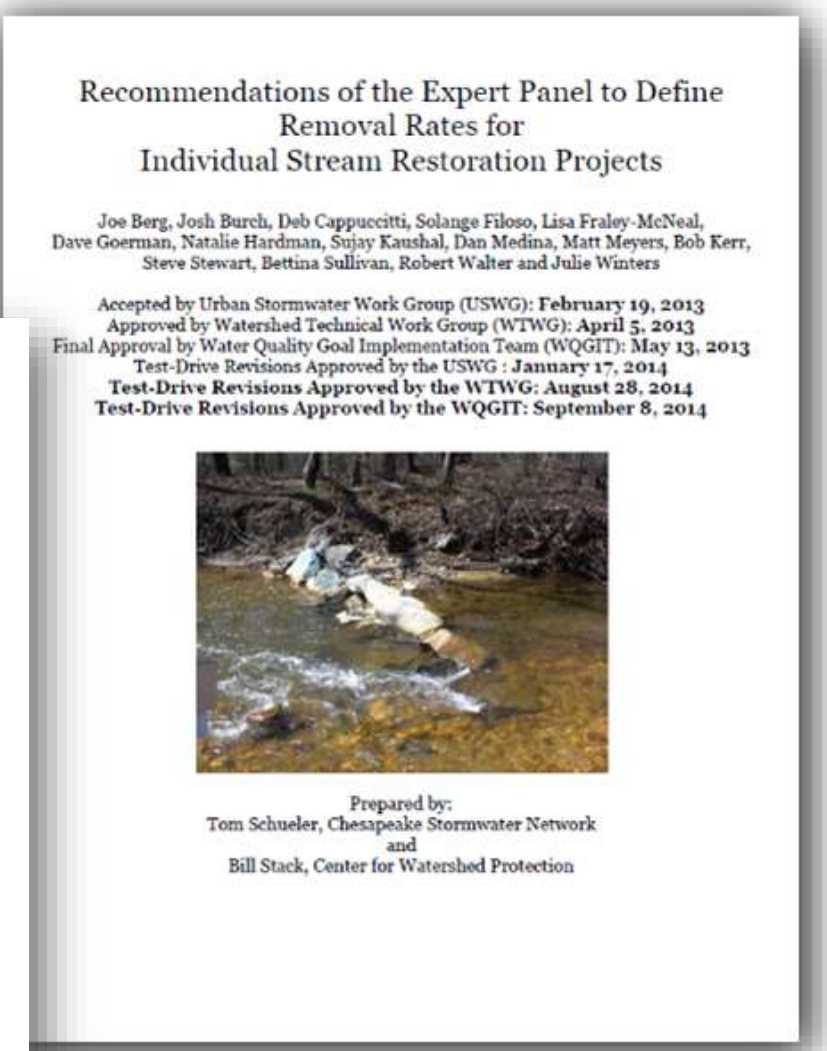
266 miles implemented since 2010.

84 additional miles planned as reported in the Phase 3 WIPs.


A Unified Guide for Crediting Stream and Floodplain Restoration Projects in the Chesapeake Bay Watershed

September 17, 2021

Prepared by: David Wood, Tom Schueler, and Bill Stack


Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects

Joe Berg, Josh Burch, Deb Cappuccitti, Solange Filoso, Lisa Fraley-McNeal, Dave Goerman, Natalie Hardman, Sujay Kaushal, Dan Medina, Matt Meyers, Bob Kerr, Steve Stewart, Bettina Sullivan, Robert Walter and Julie Winters

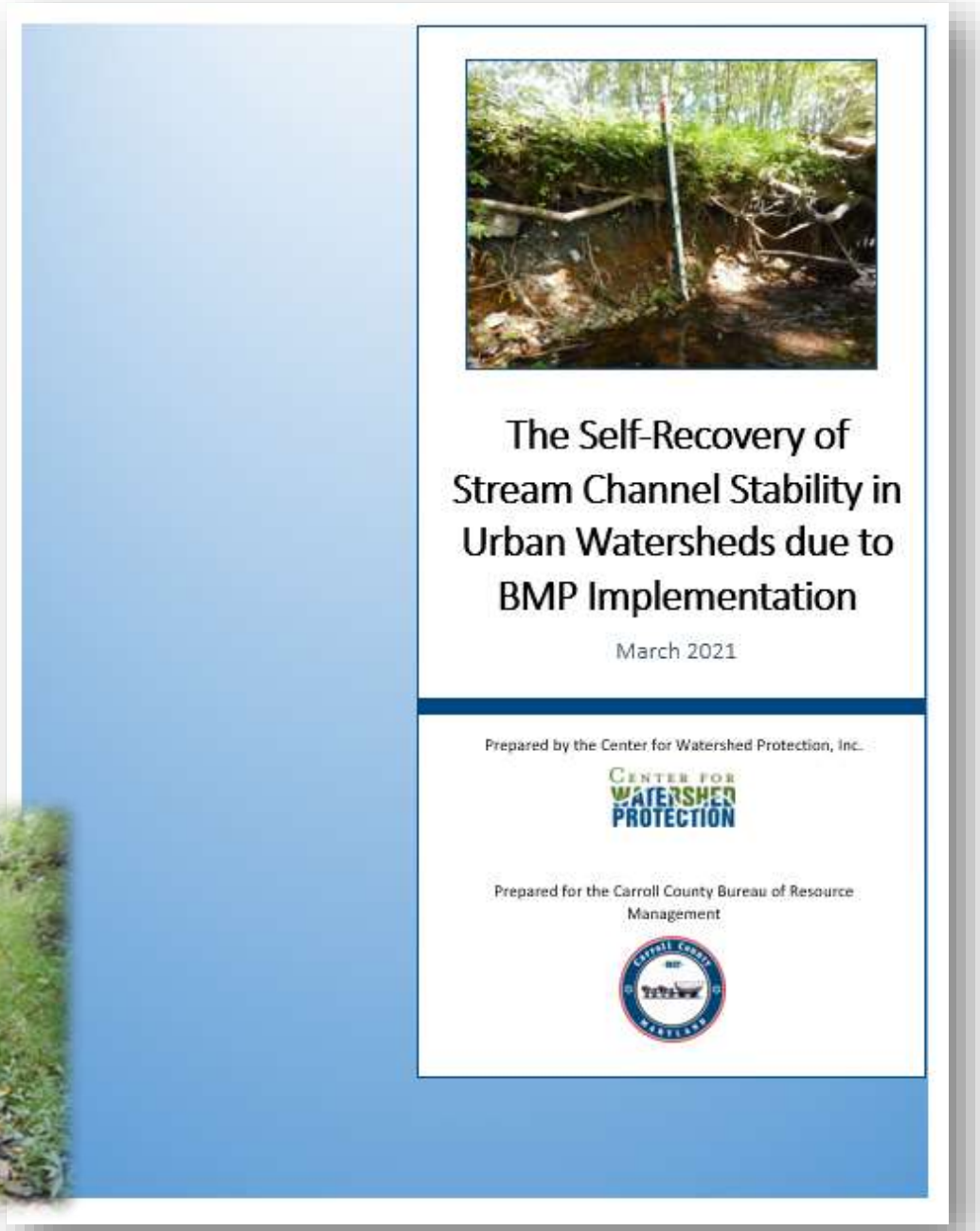
Accepted by Urban Stormwater Work Group (USWG): **February 19, 2013**
Approved by Watershed Technical Work Group (WTWG): **April 5, 2013**
Final Approval by Water Quality Goal Implementation Team (WQGIT): **May 13, 2013**
Test-Drive Revisions Approved by the USWG : **January 17, 2014**
Test-Drive Revisions Approved by the WTWG: August 28, 2014
Test-Drive Revisions Approved by the WQGIT: September 8, 2014

Prepared by:
Tom Schueler, Chesapeake Stormwater Network
and
Bill Stack, Center for Watershed Protection

Watershed Controls

Recent findings suggest unstable streambanks in headwater streams can recover channel stability due to the implementation of upstream BMPs.

Can take years before an effective geomorphic change is identified due to changes in the flow regime.



https://cbtrust.org/wp-content/uploads/Self_Recovery_of_Stream_Channel_Stability_Final_Draft_03-23-21.pdf

Project Overview

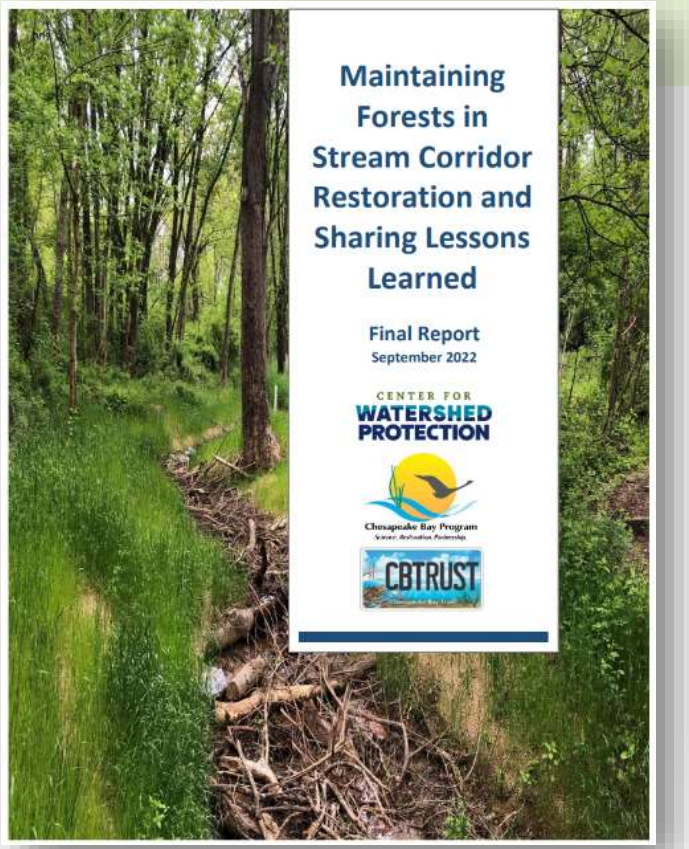
- **FUNDING & GOALS**
  - Project funded by the Chesapeake Bay Trust to evaluate processes and protocols in the Chesapeake Bay watershed that minimize potential unintended adverse outcomes of stream restoration projects on the adjacent riparian area, including forest buffers and identify opportunities to minimize these adverse outcomes and improve riparian and stream habitat quality.
  - Includes a comprehensive assessment of how forests are accounted for at multiple stages of stream restoration, including planning, permitting, implementation, and post restoration.
- **PARTNERS**
  - Collaboration between the Center for Watershed Protection, Chesapeake Bay Program, and stakeholders.
- **GEOGRAPHY**
  - Both urban and rural areas of PA, MD, and VA.
- **RESULTS**
  - Results will help CBP partnership to improve the selection, permitting, and funding processes for stream restoration projects and provide guidance to local governments for best practices.

Stakeholder Team

Name	CBP Group	Affiliation
Katie Brownson	Forestry Workgroup	USFS/ Technical lead
Sally Claggett	Forestry Workgroup	USFS/ Technical lead
Rebecca Hanmer	Forestry Workgroup	Retired EPA
Anne Hairston-Strang	Forestry Workgroup	MD Forest Service
Judy Okay	Forestry Workgroup	Okay Consulting
Frank Rodgers	Forestry Workgroup	Cacapon Institute
Pam Mason	Wetland Workgroup	VIMS
Denise Clearwater	Wetland Workgroup	MDE
Norm Goulet	Urban Stormwater Workgroup	Northern VA Regional Commission
David Wood	Urban Stormwater Workgroup	Chesapeake Stormwater Network
Renee Thompson	Healthy Watersheds	USGS
Suzanne Trevena	WQ GIT	EPA
Megan Fitzgerald	WQ GIT	EPA
Brock Reggi	Stream Health Workgroup	VA DEQ
Chris Spaur	Stream Health Workgroup	USACE
Dave Goerman		PA DEP
Christin Jolicoeur		Arlington County
Sara Weglein		MD DNR
Elmer Weibley, CPESC		Washington County SCD
Justin Williams		VA DEQ

Project Overview

- Policy and Document Review
- Interviews
- Case Study Analysis
- State Webcasts
  - PA Webcast Recording
  - MD Webcast Recording
  - VA Webcast Recording



Final Report

https://owl.cwp.org/mdocs-posts/maintaining-forests-in-stream-corridor-restoration-and-sharing-lessons-learned-final-report/

Best Practices Guide

https://owl.cwp.org/mdocs-posts/maintaining-forests-in-stream-corridor-restoration-a-best-practices-guide-for-projects-in-pennsylvania-maryland-and-virginia/

Potential Riparian Impacts

- Loss of existing trees from direct removal during construction, compaction and root disturbance, and increased groundwater elevations/extended floodplain inundation.
- Years of ecosystem maturation may be needed before a project fully meets its long-term restoration objectives and realizes its full environmental benefits (Kaushal et al., 2021; Wood et al., 2021).
- Projects that involve extensive channel reconfiguration or remove existing riparian cover are likely to see less functional uplift, including nutrient removal, at least until the replanted areas achieve maturity (Orzetti et al., 2010).
- Stream temperature impacts - STAC Temperature Workshop: https://www.chesapeake.org/stac/events/session-2-rising-watershed-and-bay-water-temperatures-e2-80-94ecological-implications-and-management-responses/
- The CBP Stream Restoration Protocols include qualifying conditions and best practices that offer some protection for riparian vegetation if implemented, but they have not been consistently applied.
- Public criticism

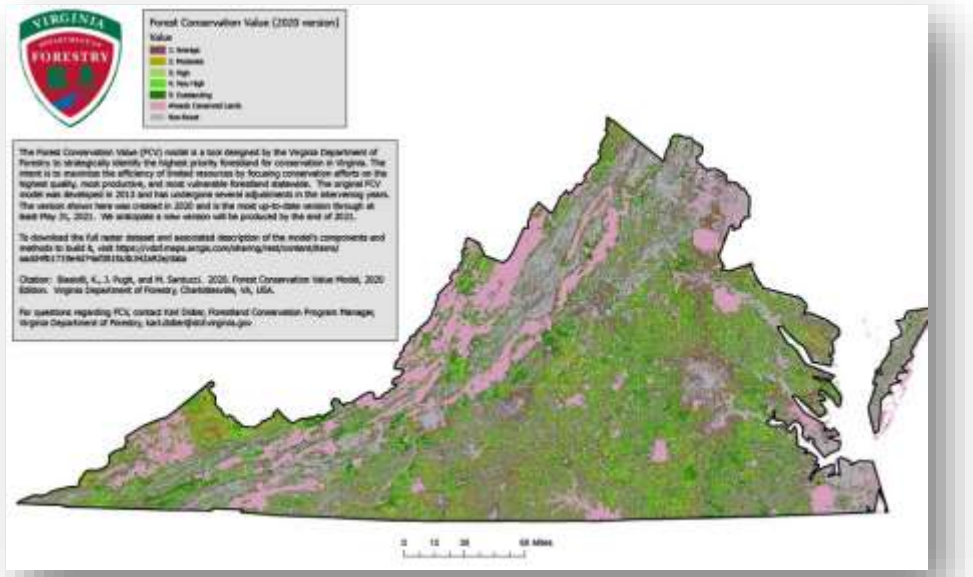
Site Selection

Proper site selection using a watershed-based approach is the most important best practice to target restoration to areas in need for restoration and prevent impacts to existing high-quality streams and riparian areas.

- Generally, sites are selected using one or a combination of:
  1. Opportunistic considerations
  2. Watershed assessments conducted as part of a watershed planning initiative
  3. Mitigation banking efforts

- Funding availability and landowner willingness drive site selection.

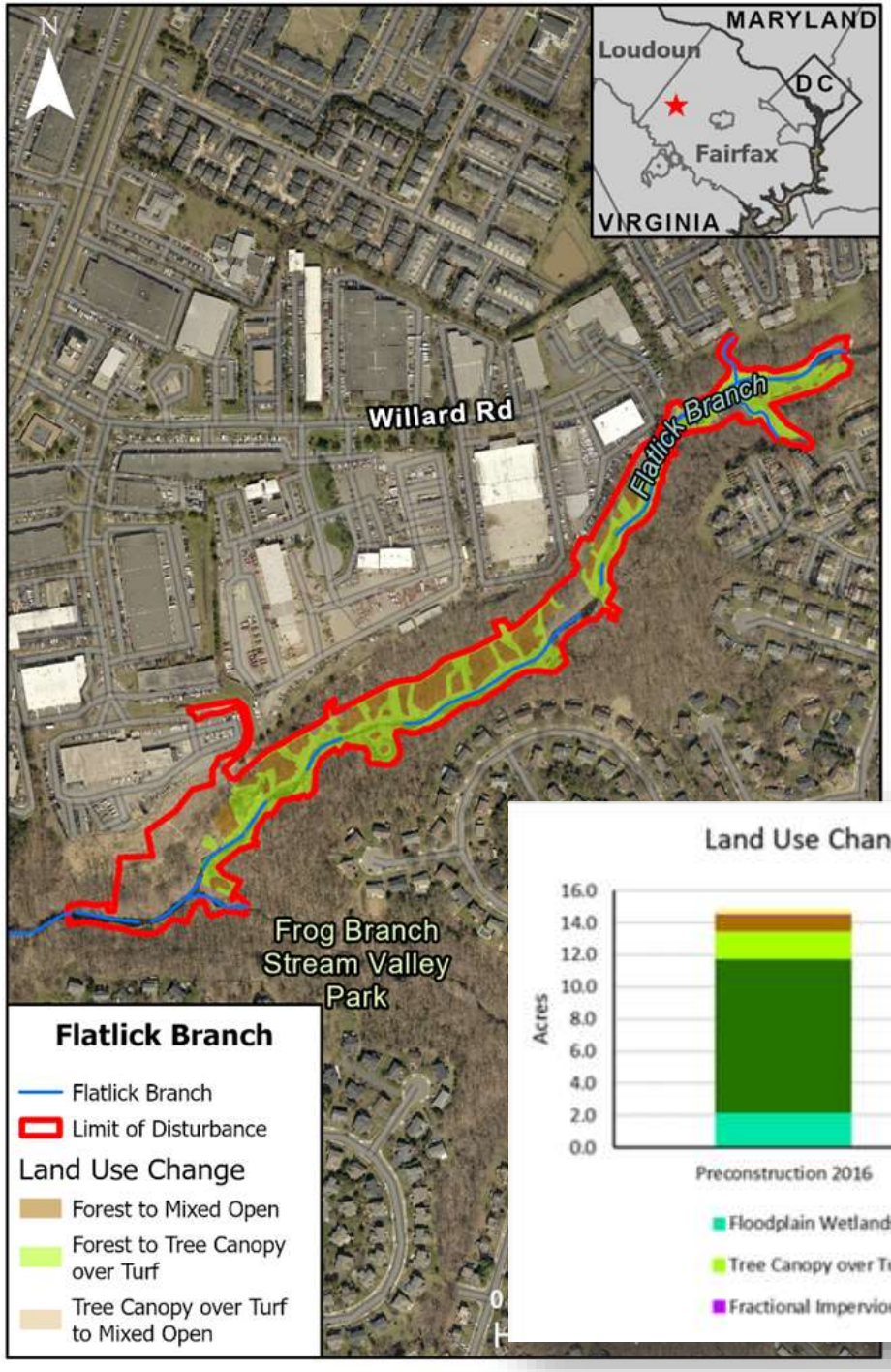
- Identified need for clear definitions of existing "high" and "low-quality" streams and riparian areas that need restoration and guidance from state regulatory agencies.

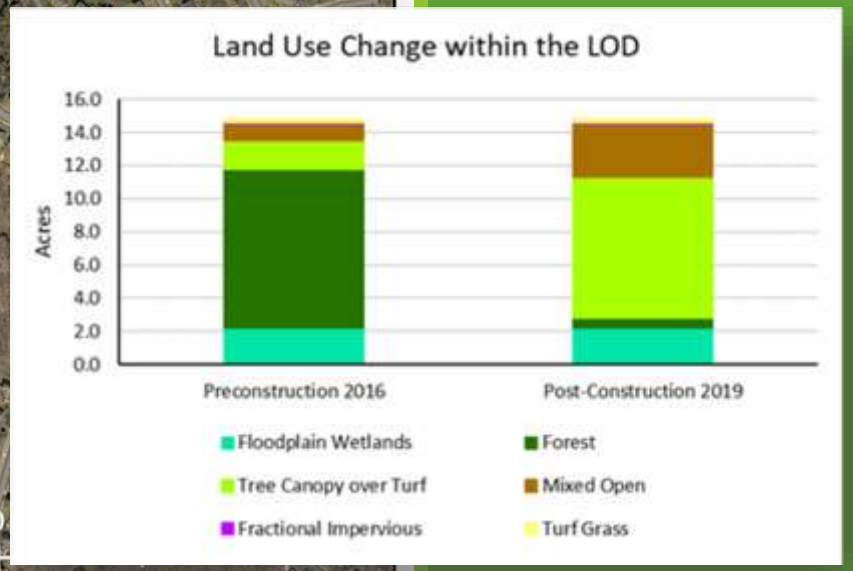


https://www.dcr.virginia.gov/natural-heritage/vaconvisforest

Establishing Goals and Objectives

- Stream restoration projects are commonly implemented with the goal of obtaining nutrient and sediment load reductions for TMDL credit only.
- The case study analysis found that the nutrient and sediment load reduction benefits of restoration significantly outweighed any increase in loads from riparian land use conversion within the context of the Chesapeake Bay Watershed Model land use and loading rate framework.
- Proposed stream restoration projects should be developed through a functional assessment process, such as the Stream Functions Pyramid.



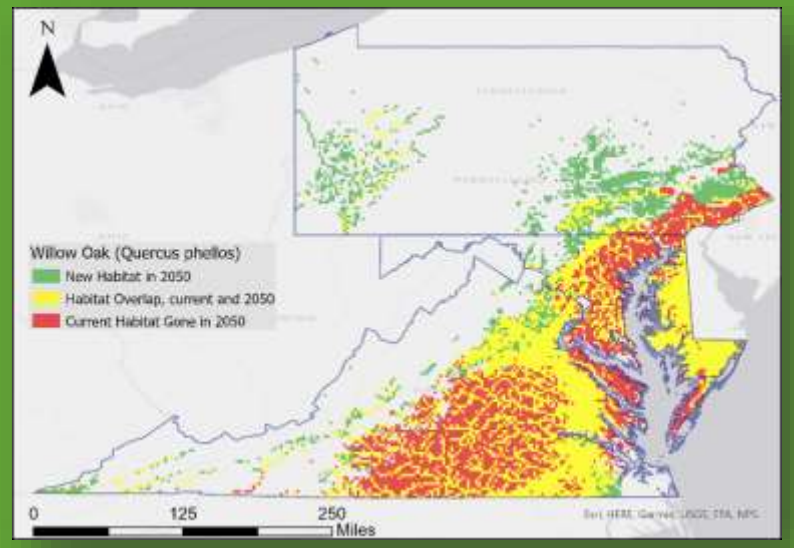


Edge-of-Stream (EOS) Load (lbs/yr)	Change in Load from Land Use Conversion Pre- to Post-Restoration	Load Reduction from Stream Restoration (CBP Crediting Protocols)
TN	15	-3,258
TP	4	-379
TSS	2,517	-91,926

Design and Permitting

Important best practices include pre-application meetings with federal and state permitting agencies and coordination with forest agencies.

Include assisted migration in planting plans to incorporate species adapted to changing climate conditions.



- The removal of entire buffers or mature trees is a value decision made by the municipality or other authorizing entities and was largely mentioned in association with legacy sediment removal, dam removal, and infrastructure protection projects.
- The types of forest agencies and their current level of involvement in the design and permitting process is highly variable among jurisdictions.
- In VA, the FEMA No-rise Certification has become a driver for stream restoration projects on larger streams to be designed following NCD Priority 2 that creates a new channel and lowers the floodplain in order to avoid requesting a CLOMR or variance to the requirements, resulting in a greater clearing footprint and hardened or armored restoration to provide stability.

https://forestthreats.org/research/tools/ForeCASTS

Monitoring and Maintenance

- Most restoration projects undergo monitoring for 2 – 5 years after construction, based on required state and federal permit conditions. CBP stream restoration verification is also required for visual inspections once every 5 years. Typically focused on stream stability and not riparian ecosystems.

- Invasive species management compounded by climate change.

- Funding was frequently mentioned as a limiting factor for extensive post-construction monitoring, particularly for grant-funded projects.

- Recommendations include a pooled monitoring approach and for local governments and funding agencies to allow for a percentage of funds to be allocated for post-construction monitoring and maintenance and extend the allowable project period so that monitoring can occur over the long-term.

Source: Ecotone, Inc.

1. Site Selection

Programmatic and Research Recommendations	Action Item	Lead Organization/ Entity	Timeframe	Priority	Level of Effort
a. State agencies should develop clear definitions of existing "low-quality" streams and riparian areas that need restoration and corresponding guidance that includes best practices and designs to minimize resource tradeoffs and other undesirable consequences of stream restoration projects.	1. Develop criteria to define what constitutes "low-quality" and "high quality" stream and riparian area characteristics for mapping.	CBP and State Agencies	Short-Term	High	Medium
	2. Develop GIS visualization of riparian areas/stream health that are defined as low quality. The MD Healthy Watersheds Assessment tool could be used as an initial screening tool/example.	CBP (HWGIT) and State Agencies	Mid-Term	Medium	High
	3. Use local level knowledge to ground-truth areas of interest found using the mapping/prioritization tool.	State, County, Municipal	Mid-Term	Medium	Medium
b. Conduct a comprehensive review of the scientific and gray literature related to stream restoration and upland stormwater controls to determine if guidelines can be developed for conditions when one practice is recommended over the other or a combination of the practices is most effective.	1. Conduct a literature review on this topic. Literature reviewed should consider soil type and geology, which influence the effectiveness of stormwater controls and receiving water quality.	CBP, CBT	Short-Term	Medium	Medium
	2. Add to the CBP Science Needs database.	CBP	Short-Term	Medium	Low

Next Steps

Questions?

Lisa Fraley-McNeal
Sr. Research Specialist
lfm@cwp.org
Office-Direct: (410) 696 - 3975