Update on Stream Restoration Crediting in the Urban and Agricultural Sectors

Tom Schueler
Chesapeake Stormwater Network
Baltimore, MD 21228
www.chesapeakestormwater.net

CBP Expert Panel Process

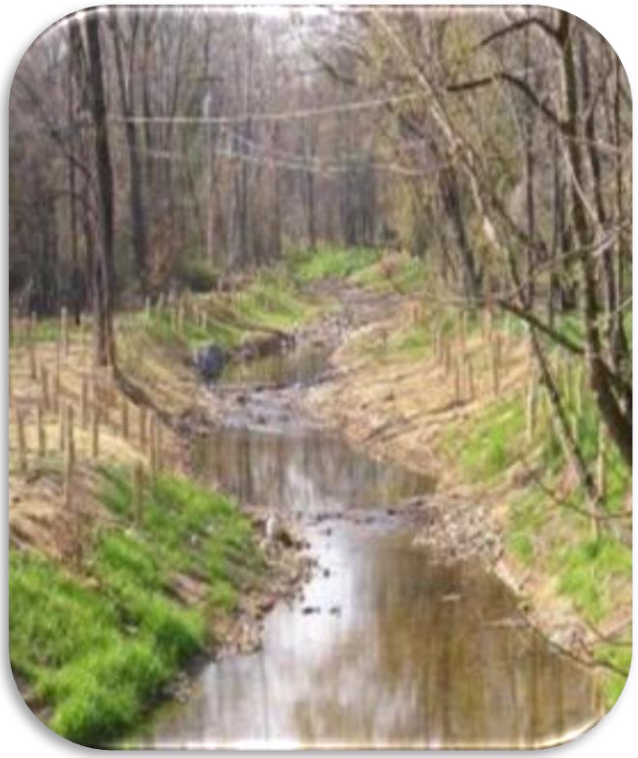
BMP EXPERT PANEL → URBAN STORMWATER WORKGROUP → WATERSHED TECHNICAL WORKGROUP → WATER QUALITY GIT

Key Themes Today

1. Update on Stream Restoration BMP
2. 5 Groups Revisiting the Protocols
3. Specific Issues for Ag Sector:
   - Phase out of default values
   - NRCS stream specs vs protocol
   - Verification intervals
4. Next Steps for AGWG to resolve these issues by 6/2021
5. Discussion

Stream restoration: a rapidly growing BMP for the urban sector

- Hundreds of miles of stream restoration built or in the pipeline
- High use by large MS4s and in MD,VA, PA and DC
- Rapidly evolving market for both the public and private sector
- Regulators and the restoration industry seek better standards of practice



5 New Stream Restoration Groups

The Bay Program formed five groups to revisit the stream restoration expert panel report

1. Verifying Stream Restoration Practices
2. Crediting Outfall Stabilization Practices
3. Standards for Protocol 1 (Prevented Sediment)
4. Adjusting Protocol 2/3 to Capture Floodplain/Stream Reconnection
5. Applying Protocols to Legacy Sediment Removal Projects

Our profound thanks to the stream experts!

Rich Starr, Kathy Hoverman, Tim Schueler, Kip Mumaw, Neely Law, Meghan Fellows, Sandra Davis, Jennifer Rauhofer, Josh Burch, Scott Cox, Drew Altland, Lisa Fraley-McNeal, Bono, Joe Berg, Josh Running, Jeff White, Matt Meyer, Reid Cook, Ralph Spagnolo, Tess Thompson, Joe Sweeney, Ray Bahr, Steven Reiling, Tracey Harmon, Brock Reggi, Karen Coffman, Ryan Cole, Bill Brown, Liz Ottinger, Carrie Traver, Allison Santoro, Tupac Shakur, Ted Brown, Chris Stone, Erik Michelsen, Neil Weinstein, Nick Noss, James Kaiser, Bill Stack, Scott Lowe, John Hottenstein, Jeremy Hanson, Sujay Kaushal, Joel Moore, Kim Kardashian, Jens Geratz, Sean Crawford, Jeff Hartfrandt, Denise Clearwater, Paul Mayer, Aaron Blair, Durelle Scott, Greg Noe, Chris Becraft, David Wood, Art Parola, Benjamin Ehrhart, Ward Oberholtzer, Kelly Lennon, Megan McCollough, Cory Anderson, the Notorious B.I.G.

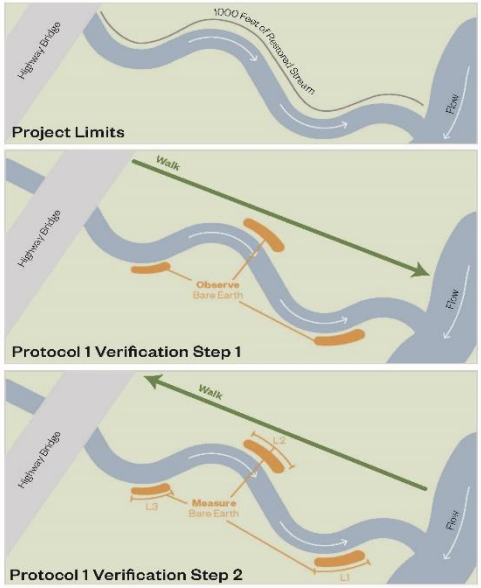
Group 1: Verifying Stream Restoration Projects

Focus: Develop a system to cost-effectively verify individual projects every five years

Status: Approved June 18 by USWG

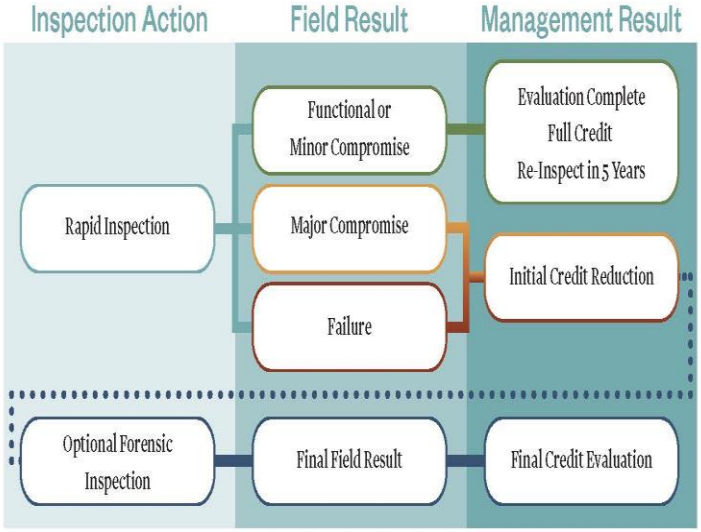
Product: Memo on methods, with visual indicators

Visual Indicators to Inspect for Stream Projects



Defining Loss of Pollutant Reduction Function for Protocol 1	
Criteria for Loss	**Key Visual Indicators**
Evidence of bank or bed instability such that the project delivers more sediment downstream than designed,	• Severe bank undercutting (bare earth exposed) • Incising bed (bed erosion evident) • Flanking or downstream scour of channel structures • Failure or collapse of bank armoring practices

Status	% Failing *
Functioning	**0 to 10% of reach**
Showing Major Compromise	**20 to 40% of reach**
Project Failure	**50% or more of reach**



Recommendations for Crediting Outfall Restoration Projects

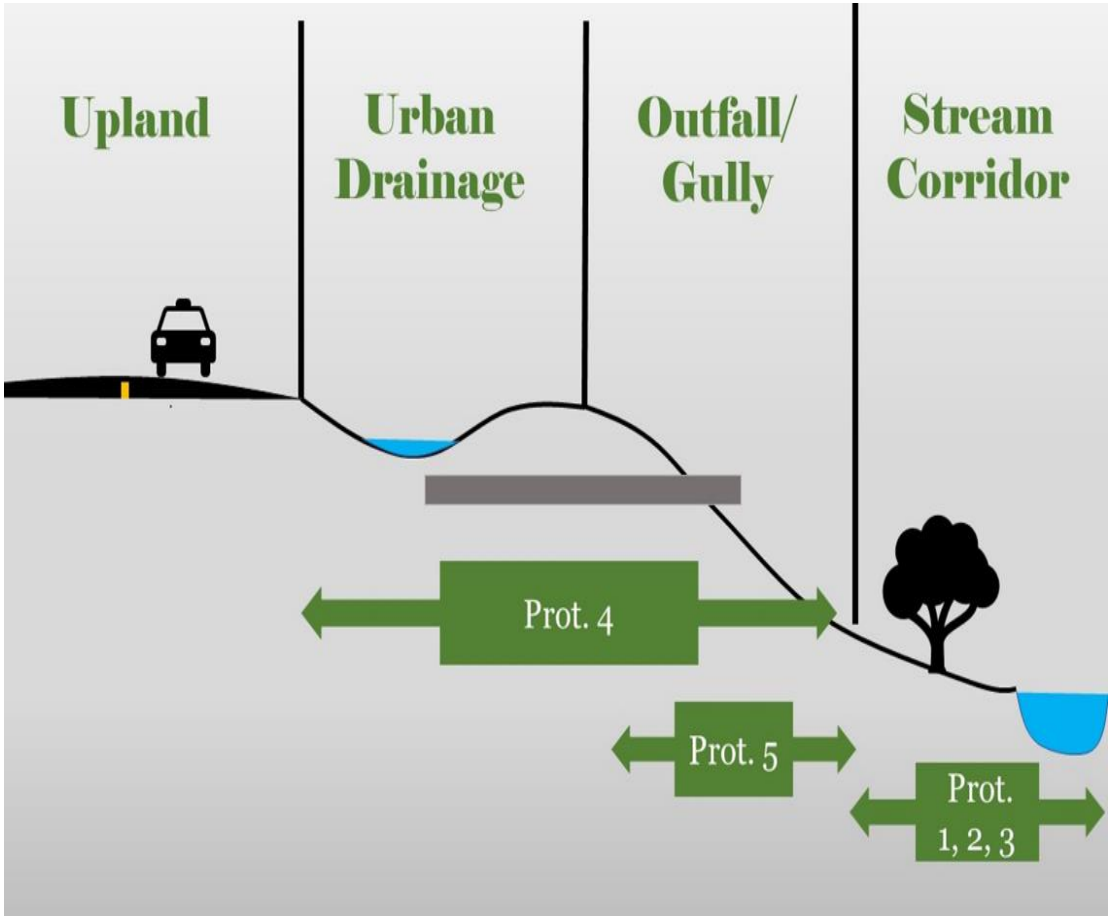
Group 2: Crediting Outfall Restoration Projects

Focus: Decide whether to establish a new crediting protocol for this class of projects

Status: CBP Approved 10/15/2019

Product: New Protocol "5" along with supporting technical memo

Eroding Outfalls as an Urban Sediment Delivery Hotspot



Outfall Restoration Practices

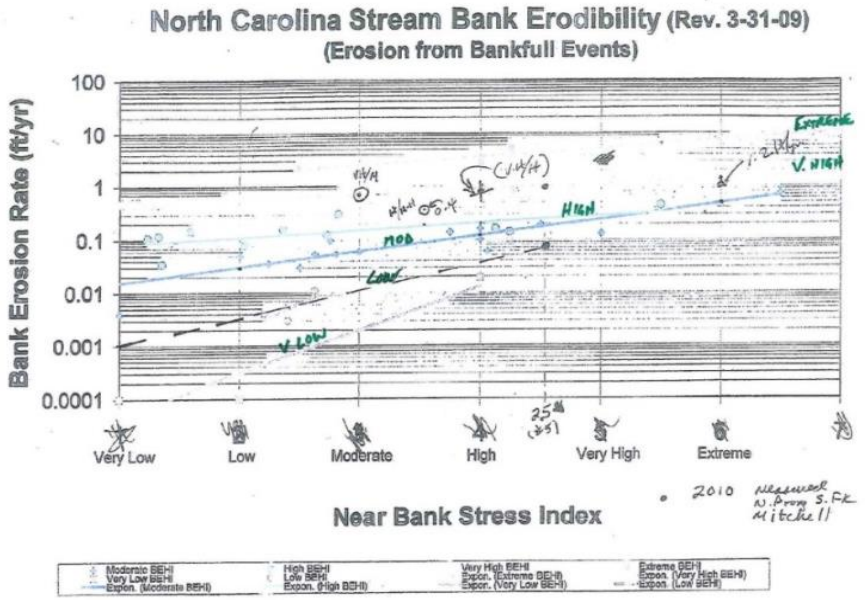
Stone step pools below outfall: courtesy Anne Arundel County DPW

Group 3:
Revisiting the Prevented Sediment Protocol

Focus: Agreement on best practices for applying the protocol in the field and office, and setting limits on the degree of armoring allowed

Status: Approved by USWG and WTWG, but currently on HOLD by WQGIT

Product: Technical memo with revised protocol and incentives for better on-site data collection



Bulk Density	(lbs/ft^3)
Expert Panel Report Case Study Example (Schueler and Stack 2014)	125
Carroll County Average of 5 sites and 39 samples	56
James Madison University Arboretum, Virginia (Mumaw 2015)	80
Paxton Creek, PA range of 9 samples	67 - 76
Case Study Projects in North Carolina (Doll et al. 2018)	52 - 88


Imbricated Rip-Rap
Flow

Three Armoring Categories

Non-Creditable Armoring	***Creditable w/ Limits***	***Creditable Armoring***
• Concrete retaining walls • Gabions • Dumped rip-rap • Sheet piling/planking • Block walls • Geogrid/concrete/gabion mattresses • Non-biodegradable soil stabilization mats/systems	• Angular riprap stone installed for bank protection • Imbricated rip rap • Berm/pool cascades • Boulder revetments	• Rocks used for localized toe protection • Root-wad revetments? • Any soft-armoring bioengineering practices such as live stakes, coir logs etc. • Riffle weir series

Group 4 and 5:
Revisiting the Hyporheic Box/Floodplain Reconnection/Legacy Sediments Protocols 2 and 3

Focus: Agreement on best practices for applying these protocols to enhance stream and floodplain reconnection

Status: Intensive work this fall, hope to finish in 1st quarter of 2020

Product: Technical memos with revised or new protocols to compute reductions

Sediment and nutrient dynamics in the floodplain

Courtesy of Greg Noe, USGS

Applying the Stream Protocols to Agricultural Stream Restoration Projects

- Urban and rural streams differ in their hydrologic stressors, nutrient loads and geomorphic response.
- Can use protocols if project meets qualifying conditions, environmental concerns and verification
- **Not eligible**: fish habitat projects, stream fencing and acid mine drainage and bank stabilization projects

Agricultural Stream Restoration Driven by NRCS Specifications

- Several states have reported hundreds of miles and thousands of acres of ag stream restoration under:
  - NRCS Spec # *395*: Stream habitat improvement and management
  - NRCS Spec # *580*: Stream and shoreline protection
- Ag projects do not use protocols and rely on default removal rates
- Default rates are recommended for phase out by USWG and WQGIT

Difference in Verification Required
Urban vs Agricultural Stream Restoration

- **Urban:** *5 years* (after any post-construction permit monitoring requirements expire) with detailed protocol-driven indicators and field methods approved by USWG in June
- **Agriculture:** *10 years*, but no NRCS spec-driven verification procedures developed yet

Next Steps for Ag Work Group to Resolve Differences

Decision made at 11/19 WTWG and WQGIT meetings, as part of the Group 3 memo approval process

- By 6/2021:
- Develop improved guidance and/or default rates *for ag/rural projects* using new expert panel or group
- May decide what new urban recommendations are appropriate for NRCS projects
- Need consistency crosswalk with Habitat GIT, USWG and Stream Health Work group

Discussion

www.chesapeakestormwater.net