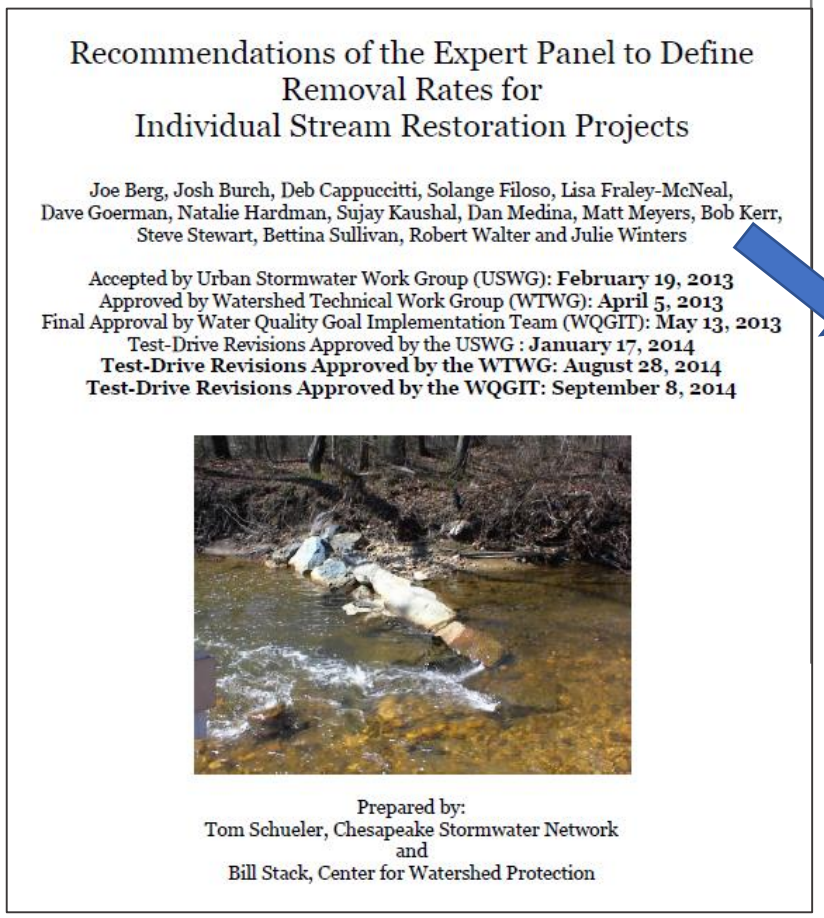
Moving Forward: Stream Restoration BMPs on Non-Urban Lands

April 16th, 2020

Background: 2013 Report & Approval Process



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

<u>Dec 2012</u>
Joint Meeting: AgWG, USWG, WTWG

<u>Jan 2013</u>
AgWG Discussion

<u>Feb 2013</u>
USWG approval (Intent to revisit in 2017)

<u>April 2013</u>
WTWG approval- "interim rate" to be used as default removal rate for historic and new projects that cannot conform to protocols

<u>May 2013</u>
Water Quality GIT approval (WQGIT)

From minutes:
Davis-Martin: Does this report apply to non-urban stream restoration until non-urban is considered separately?
Stack: Yes, the AgWG was supportive of these protocols until such time as an AgWG expert panel is convened to make recommendations for non-urban stream restoration specifically.

<u>2014</u>
"Test Drive Revisions" approved by USWG, WTWG, WQGIT including revised default removal rate

Quantifying Stream Restoration Load Reductions

(2013 Expert Panel)

Additive

Use one, two or all three!

Summary of Stream Restoration Credits for Individual Restoration Projects [1, 2]

Protocol	*Name*	*Units*	*Pollutants*	*Method*	*Reduction Rate*
1	Prevented Sediment (S)	Pounds per year	Sediment TN, TP	Define bank retreat using BANCS or other method	Measured N/P content in streambed and bank sediment
2	Instream Denitrification (B)	Pounds per year	TN	Define hyporheic box for reach	Measured unit stream denitrification rate
3	Floodplain Reconnection (S/B)	Pounds per year	Sediment TN, TP	Use curves to define volume for reconnection storm event	Measured removal rates for floodplain wetland restoration projects
4	Dry Channel RSC as a Retrofit (S/B)	Removal rate	Sediment TN, TP	Determine stormwater treatment volume	Use adjustor curves from retrofit expert panel

[1] Depending on project design, more than one protocol may be applied to each project, and the load reductions are additive.
[2] Sediment load reductions are further reduced by a sediment delivery ratio in the CBWM (which is not used in local sediment TMDLs)
S: applies to stormflow conditions, B: applies to base flow or dry weather conditions

Section 4.5
Applicability to Non-Urban Stream Restoration Projects

As noted in Section 2.3, the CBP-approved removal rate for urban stream restoration projects has been extended to non-urban stream restoration projects. Limited research exists to document the response of non-urban streams to stream restoration projects in comparison to the still limited, but more extensive literature on urban streams. However, many of the papers reviewed were from rural streams (Bukaveckas, 2007; Ensign and Doyle, 2005; Mulholland et al., 2009; and Merritts et al., 2010).

The Panel was cognizant of the fact that urban and non-urban streams differ with respect to their hydrologic stressors, nutrient loadings and geomorphic response. At the same time, urban streams also are subject to the pervasive impact of legacy sediments observed in rural and agricultural watersheds (Merritts et al., 2011). The Panel further reasoned that the prevented sediment and floodplain reconnection protocols developed for urban streams would work reasonably well in rural situations, depending on the local severity of bank erosion and the degree of floodplain disconnection.

Consequently, the Panel recommends that the urban protocols can be applied to non-urban stream restoration projects, if they are designed using the NCD, LSR, RSC or other approaches, and also meet the relevant qualifying conditions, environmental considerations and verification requirements.

At the same time, the Panel agreed that certain classes of non-urban stream restoration projects would not qualify for the removal credit. These include:

- Enhancement projects where the stream is in fair to good condition, but habitat features are added to increase fish production (e.g., trout stream habitat, brook trout restoration, removal of fish barriers, etc.)
- Projects that seek to restore streams damaged by acid mine drainage
- Riparian fencing projects to keep livestock out of streams

Limited research for non-urban stream restoration

Urban and non-urban streams are different, but developed protocols should work reasonably well

Protocols can be used for non-urban projects if all relevant conditions are met*

*EP report did not encompass all ag BMP practices being implemented for stream restoration

AgWG would use recommendations until revised by future sector-specific EP

NCD = Natural Channel Design
LSR = Legacy Sediment Removal
RSC = Regenerative Stormwater Conveyance

CBP Stream Restoration BMP Basic Qualifying Conditions (abbreviated)

Designed to promote a watershed-based approach for screening an prioritizing stream restoration projects to improve stream function and habitat.

Stream reach must be greater than 100 feet in length:

- Still actively enlarging or degrading in response to upstream development or adjustment to previous disturbances in the watershed (e.g., a road crossing and failing dams)
- Most likely located on first- to third-order streams

Must utilize a comprehensive approach to stream restoration design:

- Addressing long-term stability of the channel, banks, and floodplain

Special consideration to projects that are explicitly designed to:

- Reconnect the stream with its floodplain

or

- Create wetlands and instream habitat features known to promote nutrient uptake or denitrification.

Possibility that certain project design conditions that must be satisfied in order to be eligible for credit under one or more of the specific protocols.

LANE 1

NRCS Conservation Practice? **NO** AND **DOES NOT meet** CBP SR qualifying conditions*

Define & determine effectiveness in adherence to CBP BMP Protocol**

Seek CBP partnership approval

Report for progress (credit) if approved

LANE 2

NRCS Conservation Practice? **NO** AND **DOES meet** CBP SR qualifying conditions

Use protocols defined by USWG

Report for progress (credit)

LANE 3

UNABLE to utilize protocols defined by USWG?

Define & justify default effectiveness values in adherence to CBP BMP Protocol

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LANE 4

NRCS Conservation Practice? **YES** AND **DOES meet** CBP SR qualifying conditions

Use protocols defined by USWG

Report for progress (credit)

LANE 5

NRCS Conservation Practice? **YES** AND **DOES NOT meet** CBP SR qualifying conditions*

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AgWG priorities?

***If the project/practice is not currently partnership-approved in terms of definition, specifications, or effectiveness, this must be addressed before it can be submitted for progress towards nutrient and sediment load reductions.

Quantifying Stream Restoration Load Reductions

(2013 Expert Panel)

Additive

Use one, two or all three!

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S: applies to stormflow conditions, B: applies to base flow or dry weather conditions

OR

Default Removal Rates

2013 Report

One rate applies to entire project!

Table 3. Edge-of-Stream 2011 Interim Approved Removal Rates per Linear Foot of Qualifying Stream Restoration (lb/ft/yr)

Source	TN	TP	TSS*
Interim CBP Rate	0.20	0.068	56.11
Revised Default Rate	0.075	0.068	44.88 non-coastal plain 15.13 coastal plain

Derived from six stream restoration monitoring studies: Spring Branch, Stony Run, Powder Mill Run, Moore's Run, Beaver Run, and Beaver Dam Creek located in Maryland and Pennsylvania

*To convert edge of field values to edge of stream values a sediment delivery ratio (SDR) was applied to TSS. The SDR was revised to distinguish between coastal plain and non-coastal plain streams. The SDR is 0.181 for non-coastal plain streams and 0.061 for coastal plain streams. Additional information about the sediment delivery ratio is provided in Section 2.5 and Appendix B.

At its January 25, 2012 research workshop, the **Panel concluded that there was no scientific support to justify the use of a single rate for all stream restoration projects** (i.e., the lb/ft/yr rates shown in Tables 2 and 3).

The Watershed Technical Work Group decided in their April 1, 2013 meeting as part of their review of this report that the interim rate will be used as a default rate and will apply to historic projects and new projects that cannot conform to recommended reporting requirements as described in Section 7.1.

Technical Groups to Improve Stream Restoration Protocols (USWG)

Summary of Stream Restoration Credits for Individual Restoration Projects [1, 2]

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Sept 2018 USWG Memo: **Formation of Technical Groups to Improve Stream Restoration Protocols**

The Stream Restoration expert panel report … continues to generate controversy among practitioners, researchers, managers and regulators… Both the public and private sector have struggled to properly apply the new protocols, given the fast pace by which this new nutrient credit has been implemented across the Bay watershed.

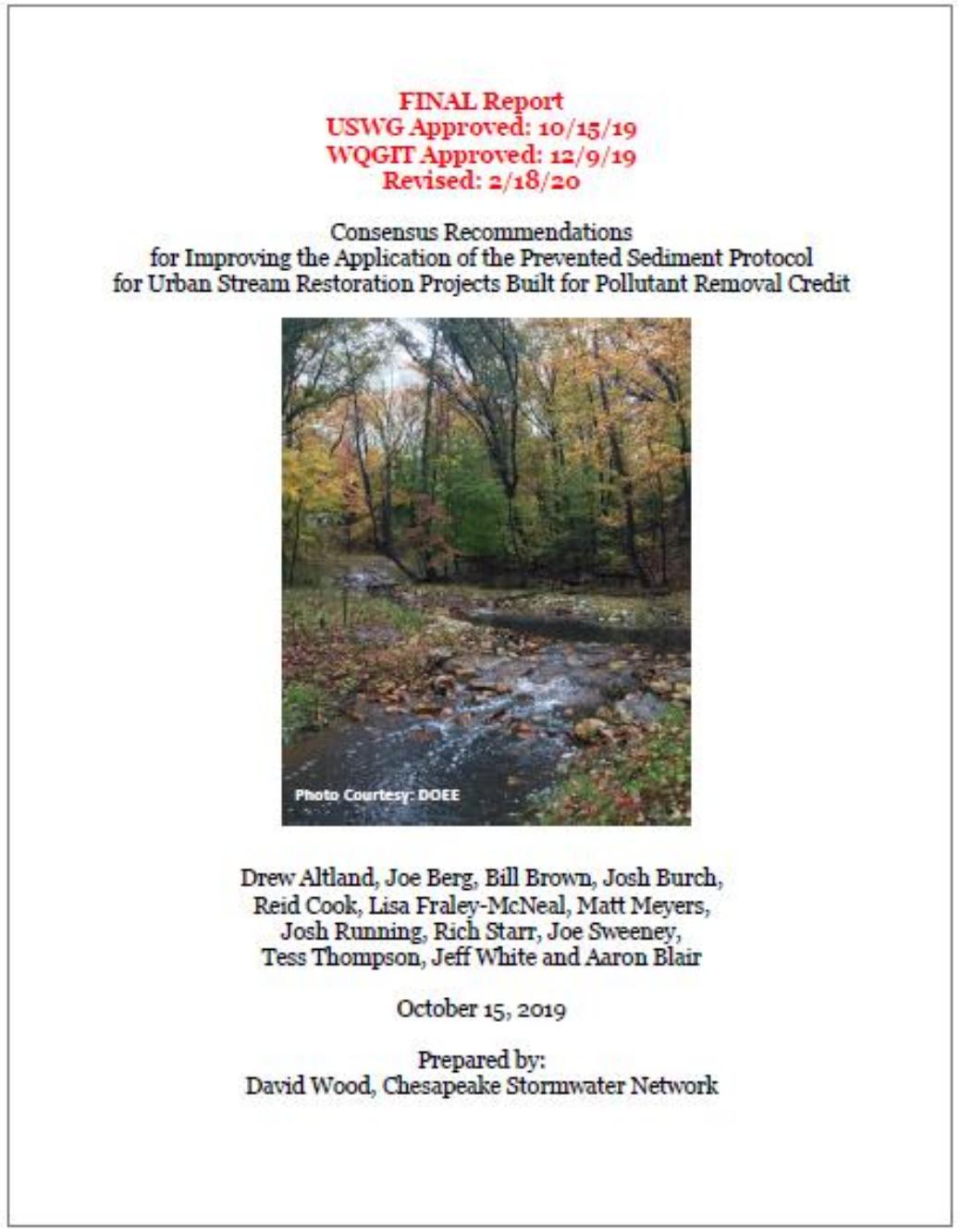
See Jan AgWG meeting for review of process.

WQGIT December 9th

- **Decision:** The WQGIT approved the Stream Restoration Prevented Sediment Memo (with subsequent added language to address PA concerns).

- **Action:** The project leads of the Stream Restoration Prevented Sediment Memo will add clarifying language that indicates the memo is **only for urban stream restoration**, with the understanding that the AgWG will create their own expert panel regarding non-urban stream restoration BMPs.

- **Grandfathering Clause:** All new definitions, qualifying conditions and Protocol 1 methods will **take effect on July 1, 2021.**



FINAL Report
USWG Approved: 10/15/19
WQGIT Approved: 12/9/19
Revised: 2/18/20

Consensus Recommendations
for Improving the Application of the Prevented Sediment Protocol
for Urban Stream Restoration Projects Built for Pollutant Removal Credit

Drew Altland, Joe Berg, Bill Brown, Josh Burch,
Reid Cook, Lisa Fraley-McNeal, Matt Meyers,
Josh Running, Rich Starr, Joe Sweeney,
Tess Thompson, Jeff White and Aaron Blair

October 15, 2019

Prepared by:
David Wood, Chesapeake Stormwater Network

Default Removal Rates

Stream Restoration Prevented Sediment Report (*Dec 2019*)

Stream Restoration Default Rates

The original expert panel provided default nutrient and sediment removal rates per linear foot of stream restoration. Due to the changes in how sediment and nutrient delivery is simulated in the new Chesapeake Bay Watershed Model, those default rates will differ for each project, depending on the stream's location in the watershed.

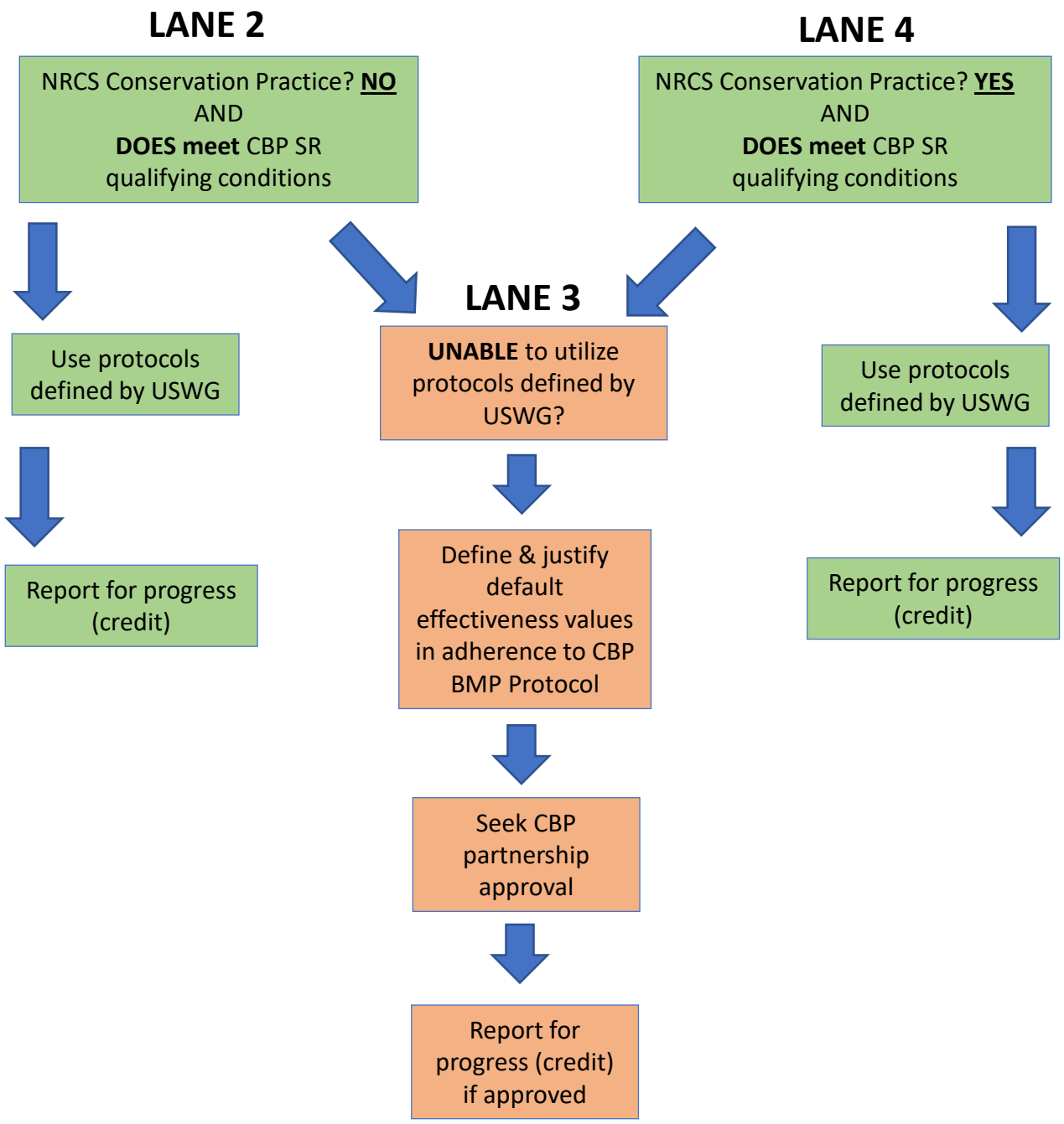
Practitioners who previously relied on the default rates for planning purposes should adjust the default rates in Table 5 by the sediment and nutrient delivery factors calculated using the steps in Appendix B in order to get an estimate based on planned linear feet of restoration.

Table 5. Default Nutrient and Sediment Reductions per Linear Foot of Qualifying Stream Restoration (lb/ft/yr), Applied at Edge-of-Stream.

Only for urban stream restoration

	TN	TP	TSS
Reduction	0.075	0.068	248

The default rates should never be used for project reporting to the state, and thus should not be accepted as a credit after a new project has been completed. Practitioners should use the recommended new Protocol 1 guidelines above to determine the prevented sediment and nutrient erosion.



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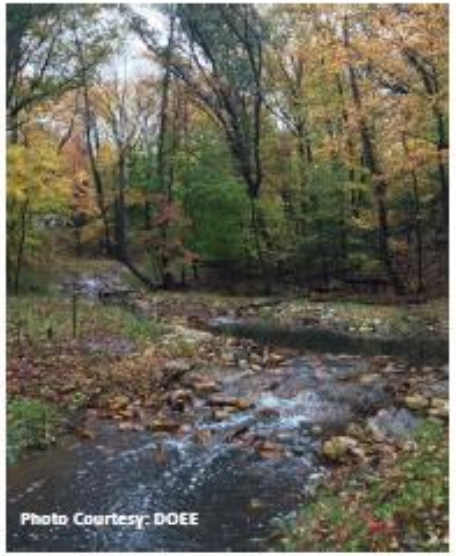

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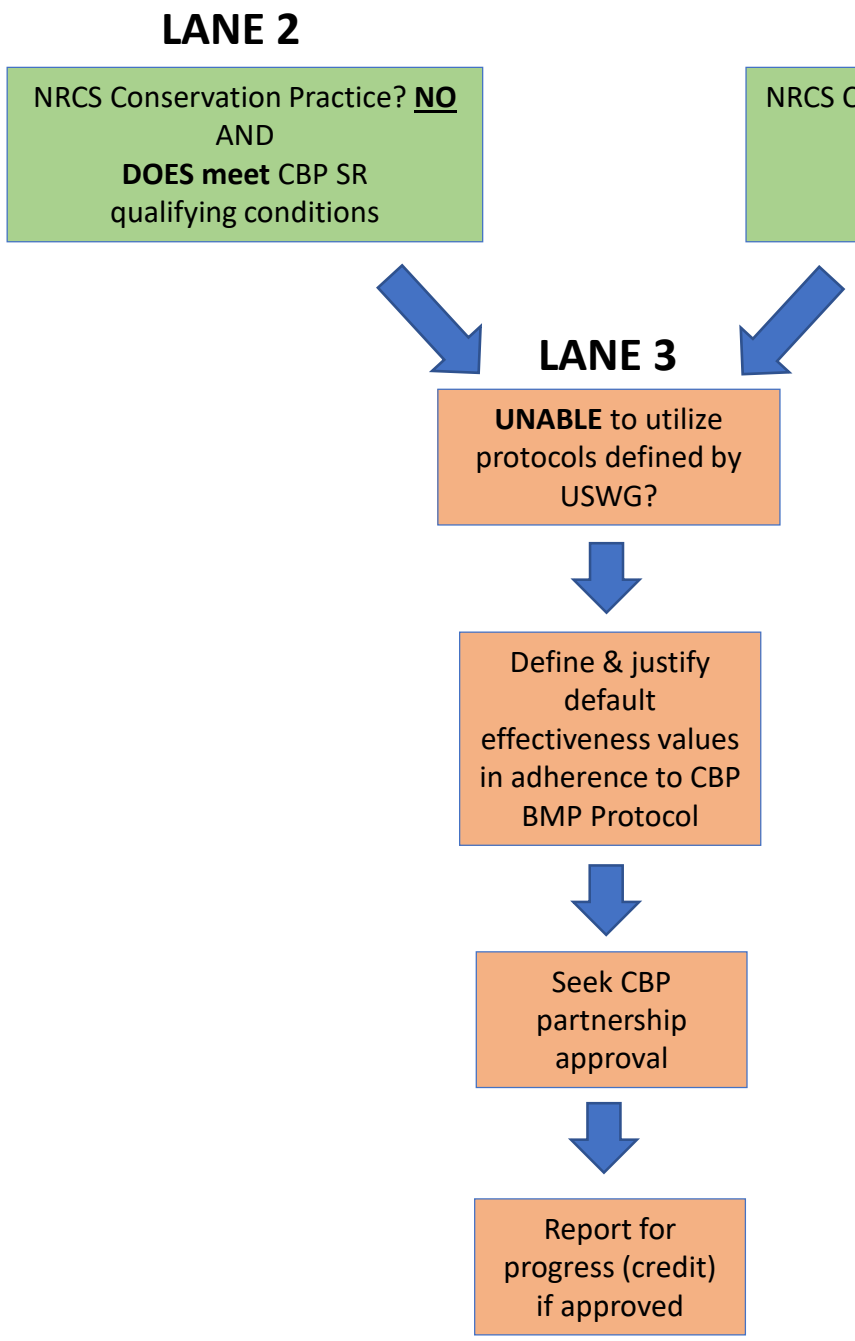
Non-Urban Projects Using Protocols?

- Each state has its own tracking and reporting processes…

- No state has reported lbs TN/TP/TSS reduced using *Non-Urban Stream Restoration Protocol* [1, 2, and/or 3] for progress as of 2019

  - Monitoring challenge?

  - Reporting challenge?
    - Are protocols being successfully reported?



ISSUE #1: Defaults

The USWG 2019 Prevented Sediment report recommends discontinuing use of the 2013 EP report's overall default removal rates for TN, TP and TSS, thus requiring submission of site-specific pollutant load calculations for each SR project.

- Site-specific collection of data for bulk density and nutrient concentrations may not be possible.
    - Without a default for load reduction- **incentive for implementation may be lost**.
- Defaults based on minimal data
    - May not be representative of non-urban projects
    - May **over-estimate effectiveness** of non-urban projects
    - More and better data may be available in 2020

ISSUE #2: NRCS Conservation Practice Standards

States must decide if an USDA-NRCS funded project meets the qualifying conditions defined by the USWG.

- Detailed NRCS project information not available to states.
- NRCS supports many projects: accurate accounting of WQ benefits from these stream restorative practices is imperative.

LANE 5

NRCS Conservation Practice? **YES** AND **DOES NOT meet** CBP SR qualifying conditions*

Define & determine effectiveness in adherence to CBP BMP Protocol**

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Report for progress (credit) if approved

USGS compiles NRCS data → NRCS data sorted into state BMPs names → Submitted to NEIEN → Mapped to Scenario Builder BMP category → **Urban Stream Restoration**; **Urban Stream Restoration Protocol 1,2,3**; **Non-Urban Stream Restoration**; **Non-Urban Stream Restoration Protocol 1,2,3**

Relevant NRCS Practices

- **Two NRCS Conservation Practice Standards (CPS) most likely to meet qualifying conditions (see CAST guidance)**

- **NRCS Conservation Practices are NOT embedded in NEIEN reporting structure**

NRCS Code	NRCS Practice	Definition	Shape	Units	NRCS Lifespan	Sector-CAST	Practice Name-NEIEN	Status- NEIEN	Official BMP-CAST?	Credit Duration-NEIEN	Within Stream Restoration Guidelines?
395	Stream Habitat Improvement and Management	Improve, restore, or maintain the ecological fu...	Polygon	Ac	5	Ag	Soil Conservation and Water Quality Plans	Draft	Yes	10	NO
580	Streambank and Shoreline Protection	Treatment(s) used to stabilize and protect bank...	Line	Ft	20	Natural	**Non Urban Stream Restoration**	Release	Yes	10	?
584	Channel Bed Stabilization	Measure(s) used to stabilize the bed or bottom ...	Line	Ft	10	Natural	**Non Urban Stream Restoration**	Release	Yes	10	?

ISSUE #3: Credit Duration

Duration of Stream Restoration Credit

- Max duration for the removal credits is 5 years
- Can be renewed based on a field performance inspection that verifies the project still exists, is adequately maintained and operating as designed.
- Duration of the credit is shorter than other structural urban BMPs, as these projects are:
  - subject to catastrophic damage from extreme flood events
  - have requirements for 3 to 5 years of post-construction monitoring to satisfy permit conditions

NEIEN Appendix 2019

BMP_NAME	DEFAULT_SB_LAND_USE	TARGET_U	CREDIT_DURATION
Stream Restoration Ag	StreamBedAndBank	Protocol 1	10
Stream Restoration Ag	StreamBedAndBank	Protocol 1	10
Stream Restoration Ag	StreamBedAndBank	Protocol 1	10
Stream Restoration Ag	StreamBedAndBank	Protocol 2	10
Stream Restoration Ag	StreamBedAndBank	Protocol 3	10
Stream Restoration Ag	StreamBedAndBank	Protocol 3	10
Stream Restoration Ag	StreamBedAndBank	Protocol 3	10
Stream Restoration Urban	StreamBedAndBank	Protocol 1	5
Stream Restoration Urban	StreamBedAndBank	Protocol 1	5
Stream Restoration Urban	StreamBedAndBank	Protocol 1	5
Stream Restoration Urban	StreamBedAndBank	Protocol 2	5
Stream Restoration Urban	StreamBedAndBank	Protocol 3	5
Stream Restoration Urban	StreamBedAndBank	Protocol 3	5
Stream Restoration Urban	StreamBedAndBank	Protocol 3	5

Documentation?

AgWG Jan 2013 Minutes

- Urban Stream Restoration cont.
  - NGO comment on short length of credit life span based on value of investments
  - Response: renewal available via inspections for longer crediting period

AgWG 2015 Credit Duration Discussions

NRCS Code	NRCS Practice	Definition	Shape	Units	Effective	Lifespan
580	Streambank and Shoreline Protection	Treatment(s) used to stabilize and protect bank...	Line	Ft	11/6/2018	20
584	Channel Bed Stabilization	Measure(s) used to stabilize the bed or bottom ...	Line	Ft	11/7/2018	10

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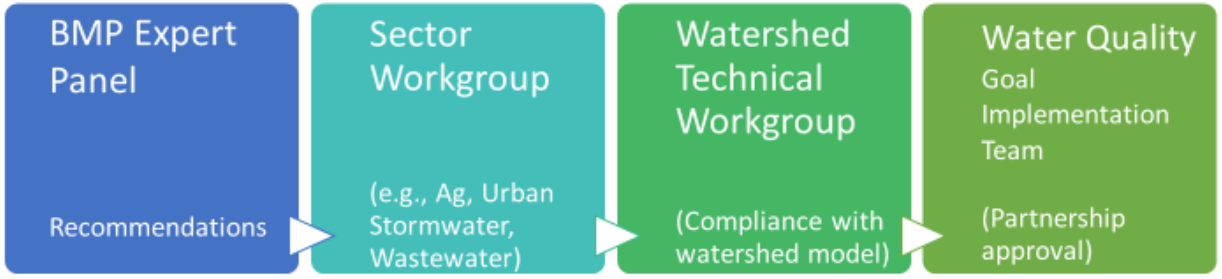
Chesapeake Bay Program
Science. Restoration. Partnership.

Best Management Practice (BMP) Expert Panels

Independent Peer Review
- Protocol in accordance with National Academy of Sciences standard practices
- Effectiveness Estimates for Proposed BMPs

The National Academies of SCIENCES ENGINEERING MEDICINE

Key Components:
- Consistent
- Transparent
- Scientifically Defensible



LANE 5

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LANE 2

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Use protocols defined by USWG

Report for progress (credit)

LANE 3

UNABLE to utilize protocols defined by USWG?

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AgWG priorities?

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All new definitions, qualifying conditions and Protocol 1 methods will **take effect on July 1, 2021.**

Possible Paths Forward:

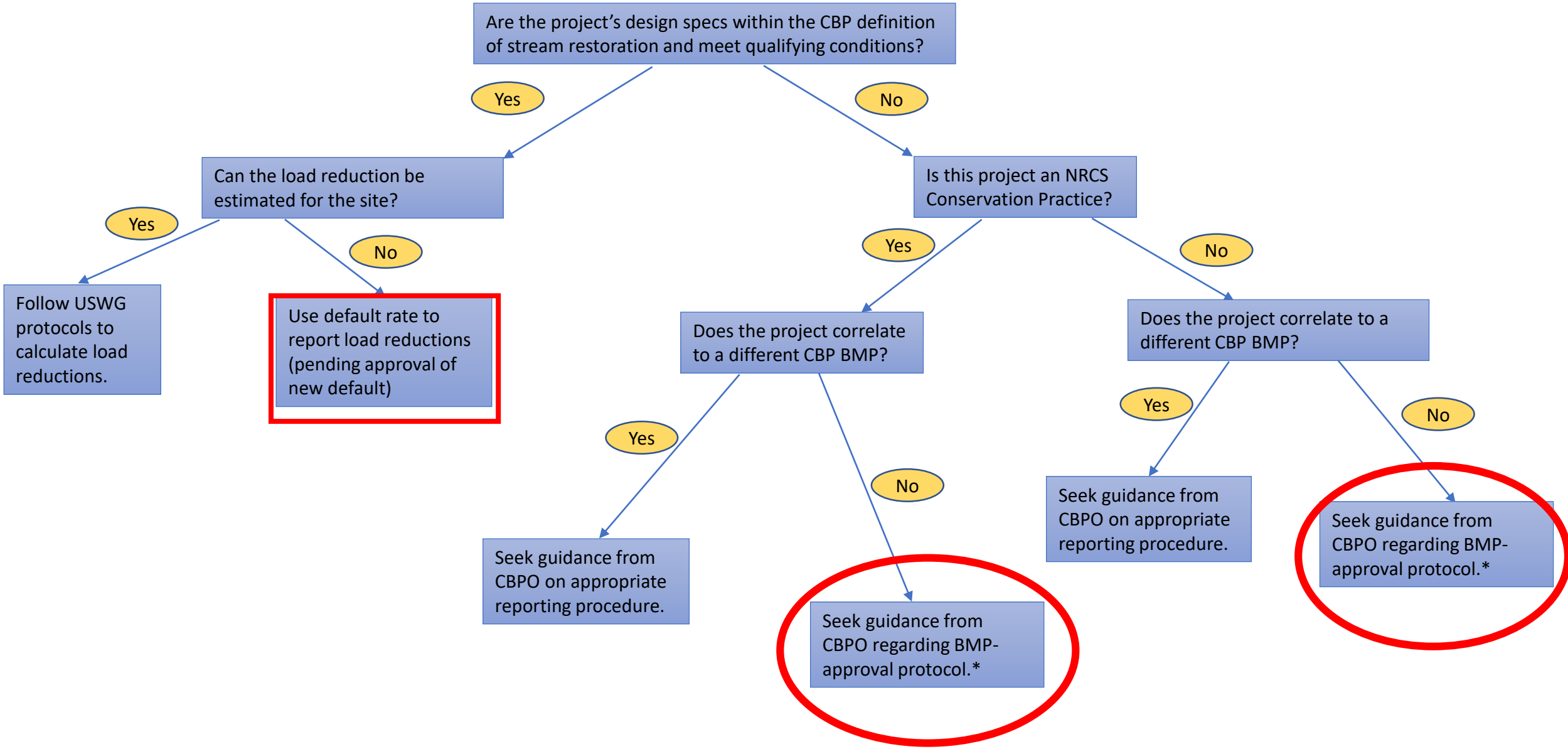
	Advantages	Disadvantages
Option #1: Form an Expert Panel Issue #1: Default recovery rate (Lane 3) Issue #2: NRCS Conservation Practice Standards (Lane 5) Issue #3: Credit duration	• Fits within CBP BMP Expert Panel protocol- avoid controversy • Address all issues	• Long process, likely 1 year + • Resource intensive • No dedicated funds for BMP Expert Panels
Option #2: Ad hoc group of experts and specialists Issue #1: Default recovery rate (Lane 3) Issue #3: Credit duration	• *Might* be faster • Addresses #1 priority issue (Lane 3)	• Need to justify with CBP BMP Expert Panel protocol • Subject to scrutiny • Will not address NRCS CPS questions • Must work within "qualifying conditions" for stream restoration projects defined by USWG • Will not address projects outside of USWG conditions

From this discussion:

Decide on steps forward for clarifying the issues to be addressed to ensure that states can continue to rely on stream restoration on non-urban land as a creditable BMP:

- Post-discussion feedback requested
- May 21 AgWG call: Decide on path forward
- May 25 Water Quality GIT call: Seek approval for path forward

https://aeroleads.com/blog/how-to-shorten-b2b-sales-cycle/next-steps/



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