FREQUENTLY ASKED QUESTIONS:
URBAN STREAM RESTORATION BMP

OVERVIEW

In May of 2013, the Water Quality Goal Implementation Team (WQGIT) approved the "Final Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects". Due to the complexity of the crediting protocols, the Expert Panel decided to implement a 6-month "test drive" following the approval of the report to allow states and localities to test the protocols on actual projects and provide feedback. The results of the test drive and subsequent revisions to the report were published in an appendix (Appendix G) and approved by the WQGIT in September of 2014.

This document provides a "one-stop-shop" for answering questions about the crediting of Stream Restoration BMPs under the Chesapeake Bay TMDL framework. Within this document, you will learn which projects are eligible for crediting, how to apply the crediting protocols and how the credits will be simulated within the Chesapeake Bay Program's Phase 6 Watershed Model.

PROJECT ELIGIBILITY

The following section describes the qualifying conditions, outlined by the Expert Panel, that must be met for a stream restoration project to be eligible for crediting under the Chesapeake Bay TMDL framework. Stream restoration projects as defined by the Expert Panel and interpreted in this FAQ document may be subject to authorization and associated requirements from federal, State, and local agencies. The recommendations are not intended to supersede any other requirements or standards mandated by other government authorities. Consequently, some stream restoration projects may conflict with other regulatory requirements and may not be suitable or authorized in certain locations. Please contact your appropriate regulatory agency for specific questions about these requirements.

Q1. What are the basic qualifying criteria for a stream restoration project to be eligible for crediting?

A1. In addition to several protocol-specific qualifying criteria, all projects must meet the following criteria to be eligible for credit:

- Reach restored must be greater than 100ft in length.
- Reach restored must be actively enlarging or degrading.
- Reach restored MAY NOT be tidally influenced.
- The project MAY NOT be primarily designed to protect public infrastructure. Bank armoring and rip rap are not eligible for stream restoration credit.

- Restoration plan must utilize a comprehensive approach to stream restoration design, addressing long-term stability of the channel, banks, and floodplain.
- Must comply with all state and federal permitting requirements, including 404 and 401 permits.

The Expert Panel also notes that stream restoration is a carefully designed intervention to improve the hydrologic, hydraulic, geomorphic, water quality, and biological condition of degraded urban streams, and must not be implemented for the sole purpose of nutrient or sediment reduction. Restoration projects should be developed through a functional assessment process, such as the stream functions pyramid (Harman et al., 2011) or functional equivalent.

Q2. Are non-urban stream restoration projects eligible?

A2. Yes, if the stream restoration project is designed using the Natural Channel Design (NCD), Legacy Sediment Removal (LSR), Regenerative Stormwater Conveyance (RSC) or other approaches, and also meet the relevant qualifying conditions, environmental considerations and verification requirements, it is eligible to receive credit under the stream restoration BMP protocols. However, the following projects are NOT eligible for crediting:

- 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

Q3. Which perennial stream orders are eligible for crediting?

A3. First through third order perennial streams are eligible. If larger fourth and fifth order streams are found to contribute significant and uncontrolled amounts of sediment and nutrients to downstream waters, consideration for this BMP would be appropriate, however, they could not receive credit under the Chesapeake Bay TMDL framework.

Q4. Are restoration projects on zero order streams eligible for credit?

A4. Yes. Restoration projects on zero order streams, including ephemeral and intermittent streams, are eligible for credit. The approach most commonly applied to zero order streams is dry channel regenerative stormwater conveyance (RSC), which is not credited using the three stream restoration protocols. To determine credit for eligible dry RSC projects, please use the Runoff Reduction (RR) curves in the Urban Stormwater Retrofit BMP Expert Panel report.

Q5. Are wet channel RSC projects eligible?

A5. Yes, the Panel concluded that wet channel RSC systems, including inline pond retrofits, were a stream restoration practice, and their pollutant removal rate can be estimated based on the appropriate protocols outlined in this document.

Q6. Are outfall stabilization projects eligible for crediting?

A6. No. At this point in time, outfall stabilization projects are not eligible for crediting under the stream restoration protocols.

Q7. Can the protocols be used for local TMDLs in addition to the Chesapeake Bay TMDL?

A7. While these protocols may be used to estimate edge of stream pollutant load reductions from any eligible stream restoration practice, the crediting process was developed specifically for Chesapeake Bay TMDL application. Sediment delivery models and credit calculation methods may differ depending on your location, so please contact your state regulatory agency for guidance as to whether these protocols may be used to meet local TMDLs.

APPLYING THE PROTOCOLS

The Expert Panel crafted three general protocols that can be used to define the pollutant load reductions associated with individual stream restoration projects. Below is a brief description of each protocol. Design examples can be found in Appendix A, and questions about how to calculate your nutrient and sediment reduction credit are addressed in the next section of this document.

NOTE: The following protocols are additive, and an individual stream restoration project may qualify for credit under one or more of the protocols, depending on its design and overall restoration approach.

Protocol 1: Credit for Prevented Sediment during Storm Flow -- This protocol provides an annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that would otherwise be delivered downstream from an actively enlarging or incising urban stream.

Protocol 2: Credit for Instream and Riparian Nutrient Processing during Base Flow -- This protocol provides an annual mass nitrogen reduction credit for qualifying projects that include design features to promote denitrification during base flow. Qualifying projects receive credit under Protocol 1 and use this protocol to determine enhanced nitrogen removal through denitrification within the stream channel during base flow conditions. The credit is applied to a "theoretical" box where denitrification occurs through increased hyporheic exchange for that portion of the channel with hydrologic connectivity to the adjacent riparian floodplain.

Protocol 3: Credit for Floodplain Reconnection Volume-- This protocol provides an annual mass sediment and nutrient reduction credit for qualifying projects that reconnect stream channels to their floodplain over a wide range of storm events. Qualifying projects receive credit for sediment and nutrient removal under Protocols 1 and 2 and use this protocol to determine enhanced sediment and nutrient removal through floodplain wetland connection. A wetland-like treatment is used to compute the load reduction attributable to floodplain deposition, plant uptake, denitrification and other biological and physical processes.

Protocol 4: Credit for Dry Channel RSC as an Upland Stormwater Retrofit-- This protocol computes an annual nutrient and sediment reduction rate for the contributing drainage area to a qualifying dry channel RSC project. The rate is determined by the volume of stormwater treatment provided in the

upland area using the retrofit rate adjustor curves developed by the Stormwater Retrofit Expert Panel (WQGIT, 2012).

DETERMINING YOUR NUTRIENT AND SEDIMENT REDUCTION CREDIT

The Expert Panel recommended that all qualifying stream restoration projects receive credit towards meeting the Chesapeake Bay TMDL requirements for reducing nutrients and sediments. The specific nutrient reductions vary from site to site based upon application of the four stream restoration crediting protocols, however, the Expert Panel also recommended default reduction rates for planning purposes as well as for crediting non-conforming practices.

Q8. What are the default nutrient and sediment reductions for eligible stream restoration BMPs?

A8.

Table 1. Default Nutrient and Sediment Reductions per Linear Foot of Qualifying Stream Restoration (lb/ft/yr), Applied at Edge-of-Stream.

	TN	**TP**	**TSS**
Reduction	0.075	0.068	248

Q9. When should I use the default rate versus the Protocols?

A9. The Watershed Technical Work Group decided in their April 1, 2013 meeting that the default rate will apply to historic projects and new projects that cannot conform to recommended reporting requirements as described in Section 7.1. of the Expert Panel Report. The expert panel encouraged the use of the Protocols in all other instances.

Q 10. Does the default rate apply to just one side of the stream, or can I receive double the credit if my project restores both banks?

A10. The default rate is based upon measurements of the entire reach using the assumption that both sides of the stream were restored. If only one side of the stream is restored, you should not use the default rate, but instead apply the Protocols.

Q11. What are the appropriate curves to use to estimate the erosion rates for Protocol 1?

A11. The expert panel provided the Hickey Run curves, developed by the U.S. Fish and Wildlife Service, as an example, although it should be used with relative caution because limited data was used to construct some of the curves. As an alternative, practitioners can use the spreadsheet in Appendix B that was developed specifically for TMDL purposes using data from multiple stream sources including Hickey Run. This spreadsheet allows for user defined variables such as bulk density and nutrient

concentration. Other options, including adjusted Hickey Run curves, and new Fairfax curves are under development and should be available in Fall 2017.

Q12. To determine my credit using Protocol 1, I have to multiply my calculated bank erosion by a default 50% reduction estimate. If I have monitored data to prove that my reductions are greater than 50% of the bank erosion, can I receive credit for the additional reduction?

A12. Yes. Once a project has been monitored for the time period and method required by your state regulatory agency, the monitored reduction may be applied to the calculated bank erosion rate in place of the default rate. For more information on your state's monitoring requirements, please contact your state regulatory agency.

Q13. Protocol 3 only treats loads from upland sources, not from within the stream channel. How do other BMPs installed within the project's drainage area affect the stream restoration credit?

A13. In Phase 5.3.2 of the Watershed Model, Protocol 3 required jurisdictions to account for runoff reduction practices upstream of the stream restoration reach in order to determine the N, P and TSS load delivered to the project reach. In Phase 6, the same calculation method will be used to determine the load reductions from Protocol 3. However, for accounting purposes, once reported to the Chesapeake Bay Program, all stream restoration reductions are now applied to a "Stream Bed and Bank" load, not the upstream land use load, regardless of which Protocols are used. This calculation method may be revisited in the future.

Q14. If monitoring results from previous studies have shown reductions greater than the default reduction credit, can that reduction credit be used or is unique monitoring required?

A14. No. You must have site-specific monitoring data, as described in the previous question to earn pollution reduction credit that is greater than the default. A future expert panel would have the ability to review any collected monitoring data and provide new default rates in a new report.

Q15. Are there any other limitations on the nutrient and sediment reduction credits I can receive for my project?

A15. For Protocol 3, there is a minimum floodplain surface area to watershed ratio of one percent to ensure there is adequate hydraulic detention time for flows in the floodplain. The credit is discounted proportionally for projects that cannot meet this criterion. For instance, if the watershed to surface area ratio is 0.75% rather than the 1% minimum then the credit would be 75% of the full credit.

Q16. My project is eligible for credit under more than one of the protocol, can I receive credit under each?

A16. Yes. The credits are additive and you have the ability to report the pounds reduced under each of the protocols.

STREAM RESTORATION IN THE PHASE 6 WATERSHED MODEL

When the final version of the Stream Restoration Expert Panel's report was approved by WQGIT in 2014, the Chesapeake Bay Program was still tracking and crediting BMPs using the Phase 5.3.2 Watershed Model. The development of the Phase 6 Watershed Model, which will be used beginning in 2018, will result in changes to the way in which streams and sediment delivery are simulated. The following section will address questions about changes in the way sediment delivery and stream restoration BMPs are simulated in the Phase 6 Watershed Model.

Overall, these changes make the practice simpler for practitioners in several ways:

- Stream bank nutrient and sediment loads are now accounted for in the Phase 6 Model, making accounting for your reductions simpler
- There is no longer a need to calculate a sediment delivery factor before reporting your practice
- The Chesapeake Assessment Scenario Tool (CAST) is now synced directly with the Phase 6 Watershed Model, making planning and estimating your credit easier.

Q17. Are there any changes to what I need to report to NEIEN to receive credit for my stream restoration BMP in Phase 6?

A17. Below is a complete list of the parameters that should be submitted to NEIEN for each project:

- BMP Name: Stream Restoration
- Measurement Name and associated unit amount: Length Restored; Protocol 1 TN; Protocol 1 TP; Protocol 1 TSS; Protocol 2 TN; Protocol 3 TN; Protocol 3 TP; Protocol 3 TSS
- Land Use: Approved NEIEN land uses – The default land use group for Stream Restoration will be Stream Bed and Bank.
- Location: Approved NEIEN geographies: County; Hydrologic Unit Code (HUC12, HUC10, HUC8, HUC6, HUC4), State (CBWS Only)
- Date of Implementation: year the project was completed

If a jurisdiction does not report the protocol used and the pounds reduced, they will receive the default nutrient and sediment reduction credit.

Q18. Which source sector will be credited with reductions achieved by stream restoration BMPs?

A18. In the Phase 6 Model, stream loads are explicitly simulated and accounted for either as a stream bed and bank load (net positive load/source) or a stream floodplain load (net negative load/sink). All reductions from stream restoration BMPs will be credited against the stream bed and bank load. This means that they are not credited as either an urban or an agricultural BMP, but will fall in their own category.

Q19. What will happen to stream projects that have already been installed and have been credited in Phase 5.3.2 of the Watershed Model?

A19. All stream restoration projects installed and reported for the Phase 5.3.2 Watershed Model were re-reported for Phase 6 and will be credited automatically. Changes to the model could change the net delivered load from the project site, but the changes are likely to be minor and are site dependent.

Q20. Is there a cap on how much nutrient and sediment reduction credit I can receive for my project?

A20. Yes. If you report feet of stream restoration for the default credit, you will be capped at the total available linear feet of streams in the project's land-river segment. The watershed average of 16.5 linear feet of streams per acre may be used for planning purposes, or you may consult CAST. If you report pounds of TN, TP or TSS using any of the three Protocols, your load reduction will be capped at the total Stream Bed and Bank load for the Land-River Segment within which the project is located.

Q21. What happens if the load reduction credit exceeds the net delivered load for the upstream river segment?

A21. In the Phase 6 Model, the stream restoration BMP is applied to the stream bed and bank load. A cap is in place so that the load reductions from a stream restoration project can not exceed the stream bed and bank load for the Land-River segment within which the project is located, regardless of the load delivered by the upstream river segment.

Q22. Do I still need to apply a sediment delivery factor to my load reductions in the Phase 6 Model?

A22. No. In the Phase 6 Watershed Model, attenuation in 1st-3rd order streams are explicitly simulated and sediment attenuation is handled within the model, rather than prior to reporting. This does not impact the amount of credit you will ultimately receive, but eliminates one step from your reporting process. The CAST tools can be used to determine the sediment losses between the edge-of-stream (EOS) and delivered loads for planning purposes.

Q23. If I am no longer using a sediment delivery factor, how is sediment delivery being simulated in Phase 6?

A23. In the Phase 6 Model, small streams (order 1-3) are now explicitly simulated. This means that sediment delivery can now be broken into two separate processes: "edge of field" to "edge of stream", and "edge of stream" to "river". In the Phase 5.3.2 Model, when there were no small streams, there was nowhere to apply a stream to river factor, so sediment attenuation occurring within the stream had to be calculated prior to reporting. In Phase 6, sediment attenuation within the stream will be calculated by the Model, eliminating the need to apply a sediment delivery factor when calculating your BMP reductions for reporting purposes.

Q24. How will a jurisdiction be able to tell, for planning purposes, what benefit a stream restoration project will have in reducing their delivered load?

A24. The Chesapeake Assessment Scenario Tool (CAST) can be used to determine the benefit of a proposed stream restoration project for planning purposes. The CAST tool is completely synced with the Phase 6 Watershed Model, and will produce the exact same load reductions. Alternatively, a community could simply use the edge-of-stream load reductions for planning purposes, since percent reductions will be the same once delivery factors are incorporated. For more information about CAST and the Phase 6 Model, please visit the following resources:

- Mid-Point Assessment Page: https://mpa.chesapeakebay.net/Phase6FAQ.html
- CAST login: http://www.casttool.org/default.aspx?AcceptsCookies=yes

Q25. Placeholder for remaining questions.

A25. The Modeling Workgroup is still considering several potential changes to how sediment delivery will be simulated in the Phase 6 Watershed Model. Any future changes to the Model that could affect how the Stream Restoration BMP is interpreted and applied will be addressed in the final version of this FAQ document.

References

Harman, W., R. Starr, M. Carter, K. Tweedy, M. Clemmons, K. Suggs and C. Miller. 2011. A function-based framework for developing stream assessments, restoration goals, performance standards and standard operating procedures. U.S. Environmental Protection Agency. Office of Wetlands, Oceans and Watersheds. Washington, D.C.

Water Quality Goal Implementation Team (WQGIT). 2012. Final Approved Report: Recommendations of the Expert Panel to define removal rates for urban stormwater retrofit practices. Chesapeake Stormwater Network and EPA Chesapeake Bay Program.

Appendix A. Stream Restoration Design Examples

Appendix B. Spreadsheet for Calculating Erosion Rate Curves

This spreadsheet was developed specifically for TMDL purposes using data from multiple stream sources including Hickey Run. This spreadsheet allows for user defined variables (e.g., bulk density, nutrient concentration) but must be updated to account for the Phase 6.0 model's delivery factors. It will be included once complete.