Appendix F. Technical Requirements for the Reporting and Crediting of Stream Restoration in Scenario Builder and the Phase 5.3.2 Watershed Model

Approved by WTWG: August, 2014

Revised by WTWG for Consistency with Phase 6: May, 2017

Background: In June, 2013 the Water Quality Goal Implementation Team (WQGIT) agreed that each BMP expert panel would work with CBPO staff and the Watershed Technical Workgroup (WTWG) to develop a technical appendix for each expert panel report. The purpose of this technical appendix is to describe how the Stream Restoration Expert Panel's recommendations will be integrated into the modeling tools including NEIEN, Scenario Builder and the Watershed Model.

Q1. What are the reductions a jurisdiction can claim for Stream Restoration in the Phase 5.3.2 Watershed Model?

A1. The Expert Panel recommended that all new stream restoration projects could receive credit for reducing nutrients through three distinct protocols which target different stream restoration project designs. The table below lists each protocol and the categories of pollutants that can be reduced by each protocol. The specific nutrient reductions are not provided in this table because they vary from site to site. Finally, the panel recommended using default reduction rates for existing stream restoration projects and the WTWG recommended its use for future projects that cannot conform to recommended reporting requirements (pg. 13).

Table 1. Edge-of-Stream Pollutant Reductions for Stream Restoration Protocols

Protocol	TN Lbs/ Linear Ft/ Yr	TP Lbs/ Linear Ft/ Yr	TSS Lbs/ Linear Ft/ Yr
1 - Prevented Sediment for Storm Flow	Site-Specific	Site-Specific	Site-Specific
2 - De-Nitrification for Base Flow	Site-Specific	N/A	N/A
3 - Floodplain Reconnection	Site-Specific	Site-Specific	Site-Specific
Existing/Non-Conforming*	0.075	0.068	~~44.88/15.13~~248**

* The existing/non-conforming rates were adjusted following a test drive period. These adjustments are explained in Appendix G.

**Because small stream loads are explicitly modeled in the Phase 6 tools, no sediment delivery factors are needed to reduce the default edge-of-field rate of 248 lbs of TSS/linear ft/year published by the panel. ~~The default edge-of-field rate of 248 lbs of TSS/ linear ft/ year was multiplied by the average Phase 5.3.2 Watershed Model sediment delivery ratios for the Non-Coastal Plain (0.181) and Coastal Plain (0.061) (pg. 14).~~

Q2. What types of projects are eligible to receive credit in the Phase 5.3.2 Watershed Model?

A2. The Panel recommended stream restoration projects meet the following qualifying conditions to receive credit:

- Projects that are primarily designed to protect public infrastructure through use of bank armoring or rip rap do NOT qualify (pg. 28).
- Projects that: 1) enhance streams in fair to good conditions to improve habitat features; or 2) seek to restore streams damaged by acid mine drainage; or 3) are solely riparian fencing projects to keep livestock out of streams do NOT qualify; or 4) projects that are implemented along tidally influenced streams (pg. 31 -32).
- Stream reach must be greater than 100 feet in length and be actively enlarging or degrading (pg. 28).
- Most projects will be located on first-to third-order streams, but the BMP may be appropriate on larger fourth and fifth order streams recognizing that multiple and/or larger scale projects may be needed to achieve desired treatment goals on larger streams (pg. 28-29). The WTWG approved this BMP for use only along first, second and third order streams.
- Projects must utilize a comprehensive approach to stream restoration design, addressing long-term stability of the channel, banks and floodplain (pg. 28-29).
- Projects that prevent channel or bank erosion that would otherwise be delivered downstream from an actively enlarging or incising stream qualify for ***Protocol 1, Prevented Sediment for Storm Flow*** (pg. 32).
- Projects that include design feature to promote de-nitrification during base flow qualify for ***Protocol 2, De-Nitrification for Base Flow*** (pg. 32).
- Projects that aim to reconnect stream channels to their floodplains over a wide range of storm events qualify for ***Protocol 3, Floodplain Reconnection*** (pg.32).
- All other existing or non-conforming projects may qualify for the Existing/Non-Conforming default protocol (pg. 13).

Q3. Can a single stream restoration project qualify for two or even three of the protocol credits listed above?

A3. Yes. The Panel recognized that each stream restoration project is unique, and that many projects may contain design features targeted at reducing nutrients through multiple protocols (pg. 32).

Q4. What do jurisdictions need to submit to NEIEN in order to qualify for reductions under the stream restoration protocols listed above?

A4. Jurisdictions need to submit estimated pounds of pollutants reduced by each protocol. Section 5 of the report describes each protocol in detail and explains what data is required for each project to estimate pollutant reductions. Section 6 of the report provides example calculations for pollutant reduction for each protocol. Please note that while jurisdictions will only report total reductions for each protocol to NEIEN, they will need to collect many more site-specific parameters to calculate load reductions for each project.

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

- BMP Name: Stream Restoration; Stream Restoration Ag

- 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 UrbanWithCss while the default land use group for Stream Restoration Ag will be Ag.
- Location: Approved NEIEN geographies: County; County (CBWS Only); Hydrologic Unit Code (HUC12, HUC10, HUC8, HUC6, HUC4), State (CBWS Only)
- Date of Implementation: year the project was completed

Q5. What do jurisdictions need to submit to NEIEN in order to qualify for reductions under the Non-Conforming Protocol?

A5. Jurisdictions need to report the BMP Name (Stream Restoration or Stream Restoration Ag) and the Length Restored or other existing length measurement names within NEIEN to qualify for the non-conforming, default reductions. If jurisdictions wish to qualify for the site-specific reductions, they must also submit the pounds reduced by each protocol.

Q6. How will the modeling tools estimate the actual load reductions from each stream restoration project?

A6. Stream restoration practices treat runoff that has already filtered through upstream BMPs. The model mimics this upland treatment by simulating stream restoration practices at a watershed outlet. The pounds reduced for each pollutant will be added together and applied as a reduction at the watershed outlet for each model segment. The model simulates further reductions to nutrients between the watershed outlet and the Chesapeake Bay.

Additionally, Protocol 3 requires jurisdictions to account for runoff reduction practices upstream of the stream restoration reach. Please see Section 5 of the expert panel report for a detailed description of Protocol 3.

Q7. Are the stream restoration practices cumulative or annual BMPs?

A7. The stream restoration practices are cumulative BMPs. This means that jurisdictions should submit all parameters to NEIEN only in the year the practice is implemented.

Q8. How will the additional parameters needed to calculate the reductions from stream restoration be used by CBPO Staff?

A8. These additional parameters will not be submitted to NEIEN, and will not be used to calculate load reductions. However, CBPO Staff may compare reductions for each new project to reductions described under the interim rate. CBPO Staff may request additional parameters for the projects on a case-by-case basis if the reductions vary significantly from reductions described under the interim rate.

Q9. Do Shoreline Erosion Control practices still qualify for stream restoration credit?

A9. No. To date, no jurisdiction has submitted shoreline erosion control practices, and all new shoreline erosion control practices will be simulated using protocols defined by the Shoreline Management expert panel.

Q10. Did the Expert Panel recommend a credit for Dry Channel Regenerative Stormwater Conveyance (RSC) Retrofits?

A10. Yes. The Expert Panel recommended that RSC practices be submitted and credited using the protocols described by the Stormwater Performance Standards and Retrofits Expert Panel.

~~**Q11. Why was a "delivery factor" applied to eroded bank sediments in Protocol 1, but not applied to nutrients eroded with the bank sediment?**~~

~~A11. The Watershed Model does not explicitly simulate the small streams upon which most stream restoration activities will take place. However, these small streams are known to attenuate sediment and nutrients as they are transported downstream. The panel recommended accounting for this sediment attenuation just as the Watershed Model does, but opted not to account for the attenuation of nutrients because the Model could not provide an estimate of nutrient attenuation, and the panel was unable to find estimates in the available literature (pg. 17).~~

~~The WTWG recommended the Chesapeake Bay Program develop estimates of nutrient attenuation in small streams prior to calibration of the Phase 6 Watershed Model. Development of these estimates would likely require a review of stream restoration and other BMPs which are simulated as pound rather than efficiency reductions.~~

~~Q12~~Q11**. Is it possible that reductions from stream restoration projects could exceed nutrient loads simulated in the model for any given model segment?**

~~A12~~A11. No. The WTWG recommended that the aggregate of estimated load reductions from all protocols could not exceed estimated loads from any given land-river segment in the Watershed Model. For planning purposes, please contact the CBPO to request land-river segment loads for a given year. Please note that land-river segment loads can change each year, and that estimated, local load reductions from stream restoration practices used for planning purposes may differ from load reductions seen in the Watershed Model in any given model scenario.

~~Q13~~Q12**. The panel recommended that reductions in nitrogen derived by Protocol 2 be capped at 40% of nitrogen loads in any given model segment (pg. 39). How will the Watershed Model apply this cap?**

A13. Protocol 2 deals specifically with denitrification, which only impacts the nitrate portion of total nitrogen. The WTWG recommended that this 40% cap apply to the nitrate portion of the total nitrogen loads in any given modeling segment. For planning purposes, please contact the CBPO to request land-river segment loads for a given year.