**Appendix C. Technical Requirements for Entering the Shoreline Management Practice into Scenario Builder and the Watershed Model**

**Presented to WTWG for Review and Approval: December, 2014**

**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 Shoreline Management 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 Shoreline Management practices implemented after the calibration period (post-2005) in the Phase 5.3.2 Watershed Model?**

A1. The panel recommended that all new shoreline management projects could receive credit for reducing nutrients and sediment through four distinct protocols which target different aspects of typical shoreline management designs. The table below lists each protocol’s default nutrient and sediment reductions.

**Table 1. Pollutant Reductions Available from Each Protocol**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Protocol** | **Submitted Unit** | **Total Nitrogen (lbs per unit)** | **Total Phosphorus (lbs per unit)** | **Total Suspended Sediment**  **(lbs per unit)** |
| **Protocol 1 - Prevented Sediment** | Linear Feet | NA at this time\* | NA at this time\* | Project-Specific |
| **Protocol 2 – Denitrification** | Acres of re-vegetation | 85 | NA | NA |
| **Protocol 3 - Sedimentation** | Acres of re-vegetation | NA | 5.289 | 6,959 |
| **Protocol 4 – Marsh Redfield Ratio** | Acres of re-vegetation | 6.83 | 0.3 | NA |
| **Non-conforming/Existing Practices** | Linear Feet | 0.075\*\* (NA at this time) | 0.068\*\* (NA at this time) | 248 (137/84)\*\* |

Source: Table 1, p. 3 of the expert panel report

\*The expert panel recommended no reductions for TN and TP until the Modeling Workgroup has an opportunity to evaluate the availability of TN and TP in shoreline sediments. The WTWG will be asked to approve reductions following this analysis (p. 2-3).

\*\* The expert panel recommended no reductions for TN and TP until the Modeling Workgroup has an opportunity to evaluate the availability of TN and TP in shoreline sediments. The WTWG will be asked to approve reductions following this analysis (p. 2-3). The numbers listed here will be considered at that time. The expert panel recommended using the old stream restoration rates for all non-conforming/existing practices. Absent new information to provide a different default than stream restoration, the WTWG recommended using the updated default stream restoration reductions for non-conforming/existing practices. Note, that the WTWG also recommended multiplying this default sediment reduction by the sand reduction factors listed in the expert panel report of 0.551 for Maryland projects and 0.337 for Virginia projects.

**Q2. Is there a default credit available for jurisdictions for planning purposes and practices that do not have detailed reporting?**

**A2.** Yes. A jurisdiction may claim the existing default pound reductions listed in Table 1 above for planning purposes or for non-conforming or existing practices.

**Q3. What types of projects are eligible to receive credit in the Phase 5.3.2 Watershed Model?**

**A3.** The panel defined Shoreline Management as “any tidal shoreline practice that prevents and/or reduces tidal sediments to the Bay.” (p. 9) Shoreline Management practices can include living shorelines, revetments and/or breakwater systems and bulkheads and seawalls. Additionally, only practices with vegetative surface areas can receive credit for Protocol 2, Protocol 3 and Protocol 4. Regardless of the design, all practices must meet the qualifying conditions described in the Table 2 below (p.26).

**Table 2. Shoreline Management Criteria to Receive Pollutant Load Reductions**

| **Shoreline Management Practice** | **The Practice Must Meet these Criteria for TMDL Pollutant Load Reduction1** |
| --- | --- |
| Living Shoreline –  a) nonstructural;  b) hybrid system including a sill; and  c) hybrid system including a breakwater | 1. The site is currently experiencing shoreline erosion or is replacing existing armor. The site was graded, vegetated, and excess sediment was removed or used.2   AND   1. When a marsh fringe habitat (a or b) or beach/dune habitat (c) is created, enhanced, or maintained. |
| Revetment AND/OR Breakwater system without a living shoreline | 1. The site is currently experiencing shoreline erosion. The site was graded, vegetated, and excess sediment was removed or used.2   AND   1. A living shoreline is not technically feasible or practicable as determined by substrate, depth, or other site constraints.   AND   1. When the breakwater footprint would not cover SAV, shellfish beds, and/or wetlands. |
| Bulkhead/Seawalls | 1. The site is currently experiencing shoreline erosion.   AND   1. The site consists of port facilities, marine industrial facilities, or other marine commercial areas where immediate offshore depth (e.g., depths deeper than 10 feet 35 feet from shore) precludes living shoreline stabilization or the use of a breakwater or revetment. |
| 1Projects that impact the Chesapeake Bay Preservation Act protected vegetation without mitigation receive no Chesapeake Bay TMDL pollutant load reduction.  2Bank analysis that demonstrates the site has bank stability and does not have erosion can serve to meet this qualifying condition. This should be coordinated with the local reporting authority to ensure proper methods, reporting, and requirements are done and are accepted by that authority so that the project meets this basic qualifying condition. | |

**Q4. Can a shoreline management project qualify for multiple protocols?**

**A4.** Yes. Practices that have BOTH vegetated areas and are designed to prevent sediment erosion may qualify for reductions from all four protocols. These reductions will be added together in Scenario Builder. Practices that do not have vegetated areas may only qualify for Protocol 1 – Prevented Sediment.

**Q5. What do jurisdictions need to submit to NEIEN in order to qualify for reductions under the protocols listed in Table 1?**

**A5**. Below is a complete list of the parameters that should be submitted to NEIEN for each project.

* BMP Name: Urban Shoreline Management; Urban Shoreline Non-Vegetated; Urban Shoreline Vegetated; Ag Shoreline Management; Ag Shoreline Non-Vegetated; Ag Shoreline Vegetated
* Measurement Name and associated unit amount: Length Restored; Acres Planted; Protocol 1 N; Protocol 1 P; Protocol 1 TSS
* Land Use: N/A; this BMP will be simulated adjacent to or within tidal waters.
* Location: Approved NEIEN geographies: Latitude/Longitude (preferred);County; County (CBWS Only); Hydrologic Unit Code (HUC12, HUC10, HUC8, HUC6, HUC4), State (CBWS Only)
* Date of Implementation: year the project was completed

**Q6. How should a jurisdiction report a practice with no vegetation?**

**A6.** If jurisdictions wish to receive credit for non-vegetative shoreline management practices beyond the default, non-conforming rates, they should report the Length Restored AND Protocol 1 N, Protocol 1 P and Protocol 1 TSS measurement names to NEIEN. The values for each of these measurement names can be found using the equations presented in Section 5.2.1 of the expert panel report (p. 32-35). See the flowchart below question 7 for a detailed description of NEIEN submission needs.

**Q7. How should a jurisdiction report a practice with vegetation?**

**A7.** If a jurisdiction wishes to claim credit beyond the default, non-conforming rates for vegetative shoreline management practices, they should report Length Restored, Acres Planted AND Protocol 1 N, Protocol 1 P, and Protocol 1 TSS measurement names to NEIEN. The values for each of the Protocol 1 measurement names can be found using the equations presented in Section 5.2.1 of the expert panel report. See the flowchart below question 7 for a detailed description of NEIEN submission needs.

**Flowchart of NEIEN Reporting Requirements**

**Q8: How will the modeling tools simulate reductions from shoreline management practices?**

A8: Tidal shoreline erosion occurs at the interface between the watershed and the Chesapeake Bay’s tidal waters. The Watershed Model domain ends at the tidal shoreline, and shoreline erosion loads are actually simulated by the estuarine Water Quality Sediment Transport Model (WQSTM). The load reductions, therefore, will be simulated as reductions in the WQSTM. However, the Watershed Model is the accounting tool used to credit reductions to nutrients and sediments delivered to the Bay by all best management practices. For this reason, the WTWG recommended that reductions from shoreline management practices be counted as reductions in delivered nutrients and sediment from each Watershed Model land-river segment within which the practices are implemented. This will have an identical effect to reducing the shoreline erosion rates within the WQSTM, but will allow the practices to remain within the accounting and crediting framework.

The WTWG also recommended that the CBP’s Modeling Workgroup consider explicitly simulating nutrient loads from the shoreline within the WQSTM for the 2017 mid-point assessment. The WTWG will also discuss if these explicitly simulated nutrient and sediment loads should be reported as loads within the Phase 6 Watershed Model.

**Q9. Is this BMP an annual or cumulative practice?**

**A9**. The BMP is a cumulative practice. Jurisdictions should report all measurement names only at the time of installation. The practice will continue to receive credit in the model in future years.

**Q10. How will the existing Shoreline Erosion Control practices be simulated in the modeling tools?**

**A10**. To date, no jurisdiction has submitted Shoreline Erosion Control in a progress or planning scenario. This BMP will be removed. All new shoreline management projects should be reported under the new BMP name.

**Q11: Is there a cap on the potential reductions from shoreline management practices?**

**A11:** Yes. The WTWG recommends that sediment reductions from all shoreline management practices within a land-river segment should not exceed the total fine sediment shoreline erosion load estimated to enter adjacent WQSTM tidal water cells. Note that one land-river segment can be adjacent to multiple tidal water cells (pg. 36). A listing of the fine sediment erosion loads estimated from each land-river segment can be found in the tables below. You can also view maps of the estimate sediment erosion loads at:

<ftp://ftp.chesapeakebay.net/Modeling/gyactayo/Shore_erosion_maps/>

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**Q12. Where do projects need to be located to receive credit for this BMP as opposed to for the Stream Restoration BMP?**

**A12**. Jurisdictions should only submit projects that are adjacent to tidal waters. All restoration activities which limit sediment erosion on non-tidal waters should be submitted as Stream Restoration following the guidelines described by Stream Restoration Panel. The panel included a map of the modeling segments adjacent to tidal water on p. 11 of the report.

**Q13. Can jurisdictions submit historic shoreline management practices for credit?**

**A13.** Yes. Jurisdictions can submit any practices that were implemented post-2008 for credit in the modeling tools. The WQSTM already accounts for shoreline practices in place as of 2008. Jurisdictions may also submit any shoreline management practices implemented prior to 2008 as part of the historic BMP cleanup effort.

**Q14. Why is there currently no nutrient credit available for Protocol 1 or non-conforming practices?**

**A14**. The expert panel recommended no reductions for TN and TP until the Modeling Workgroup has an opportunity to evaluate the availability of TN and TP in shoreline sediments. The WTWG will be asked to approve reductions following this analysis (pg. 2-3).