CHESAPEAKE AND ATLANTIC COASTAL BAYS TRUST FUND FISCAL YEAR 2016 SOLICITATION

NUTRIENT AND SEDIMENT REDUCTION CALCULATOR INSTRUCTIONS

This document provides the step-by-step instructions you will need to use the provided nutrient and sediment reduction calculator. The calculator was developed using the Chesapeake Bay Program's Watershed Model Best Management Practice (BMP) removal rates, incorporates land use loading rates at the 8-digit watershed scale, and assumes a "no action" scenario. All proposals submitted in response to the Trust Fund's Fiscal Year 2016 solicitation must include nutrient and sediment reduction estimates, and all estimates must be calculated using this tool.

If you have questions or problems using the tool, please do not hesitate to contact the grant manager that was assigned to your Letter of Intent. He or she can help to address your problems and work through the calculations with you.

Step 1. Identify the BMP

The calculator consists of two "source sector" Excel spreadsheets – one spreadsheet will calculate the reductions for agricultural and forest BMPs and the other will calculate the reductions for urban stormwater BMPs. The first step in calculating your nutrient and sediment reductions is to determine the appropriate spreadsheet to use for the BMP you would like to implement. Please open the spreadsheets and select the first tab, titled "BMP Classification." You will find a complete listing of the BMPs included in that spreadsheet and their classifications. These lists are also provided within Tables 1 and 2 of this instructional document. Definitions of the BMPs included in each spreadsheet are provided in the second tab, titled "BMP Definitions."

Please note that if your proposal contains more than one BMP, you will need to calculate each BMP's reductions separately and sum them to get your total reduction. If your proposal contains both urban stormwater BMPs as well as agricultural or forest BMPs you will have to use both spreadsheets accordingly.

Agricultural and Forest Spreadsheet

The agricultural and forest spreadsheet includes BMPs that are credited as efficiencies, land use change BMPs, and load reductions. The list of BMPs included in this spreadsheet is provided in Table 1.

Table 1. Agricultural and Forest BMPs and their Classification

BMP	Classification
Cover Crops – Traditional and Commodity, All planting dates, species and methods	Efficiency
Barnyard Runoff Control	Efficiency
Conservation, Continuous, High Residue, Minimum Soil	Efficiency

Disturbance Tillage	
Cropland Irrigation Management	Efficiency
Dairy Manure Injection	Efficiency
Decision Ag and Enhanced Nutrient Management	Efficiency
Forest Buffers	Efficiency
Grass Buffers	Efficiency
Horse Pasture Management	Efficiency
Irrigation Water Capture Reuse	Efficiency
Loafing Lot Management	Efficiency
Off Stream Watering Without Fencing	Efficiency
Poultry Litter Injection	Efficiency
Rotational Grazing	Efficiency
Ditch Filters	Efficiency
Water Control Structures	Efficiency
Wetland Restoration	Efficiency
Forest Harvesting Practices	Efficiency
Agricultural Dirt and Gravel Road E&S Control	Load Reduction
Agricultural Stream Restoration	Load Reduction
Agricultural Shoreline Erosion Control	Load Reduction
Forest Dirt and Gravel Road E&S Control	Load Reduction
Forest Stream Restoration	Load Reduction
Forest Shoreline Erosion Control	Load Reduction
Upland Tree Planting	Land Use Change

Urban Stormwater Spreadsheet

The urban stormwater spreadsheet includes BMPs that are credited as runoff practices, stormwater treatment practices, load reductions, or land use changes. The list of BMPs included in this spreadsheet is provided in Table 2.

Table 2. Urban Stormwater BMPS and the Classification

BMP	**Classification**
Landscape Restoration/Reforestation	Efficiency as Runoff Reduction Practices (RR)
Riparian Buffer Reforestation	Efficiency as Runoff Reduction Practices (RR)
Rooftop Disconnection (aka Simple Disconnection to Amended soils, to a conservation area, to a pervious area, non-rooftop disconnection)	Efficiency as Runoff Reduction Practices (RR)
Sheetflow to Filter/Open Space (aka Sheetflow to Conservation Area, Vegetated Filter Strip)	Efficiency as Runoff Reduction Practices (RR)
All ESD practices in MD 2007	Efficiency as Runoff Reduction Practices (RR)
Bioretention or rain gardens (standard or enhanced)	Efficiency as Runoff Reduction Practices (RR)

Dry swale	Efficiency as Runoff Reduction Practices (RR)
Expanded tree pits	Efficiency as Runoff Reduction Practices (RR)
Grass channels (w/ soil amendments, aka bioswale, vegetated swale)	Efficiency as Runoff Reduction Practices (RR)
Green Roof (aka Vegetated roof)	Efficiency as Runoff Reduction Practices (RR)
Constructed Wetlands	Efficiency as Stormwater Treatment Practices (ST)
Filtering Practices (aka Constructed Filters, Sand Filters, Stormwater Filtering Systems)	Efficiency as Stormwater Treatment Practices (ST)
Proprietary Practices (aka Manufactured BMPs)	Efficiency as Stormwater Treatment Practices (ST)
Wet Ponds (aka Retention Basin)	Efficiency as Stormwater Treatment Practices (ST)
Wet Swale	Efficiency as Stormwater Treatment Practices (ST)
Dirt and Gravel Road E&S Control	Load Reduction
Shoreline Erosion Control	Load Reduction
Street Sweeping	Load Reduction
Impervious Surface Removal	Land Use Change

Step 2. Identify the MD 8 Digit Watershed

Second, identify the MD 8-digit watershed in which your BMP will be located. If you don't already know it, you can find the 8-digit watershed through MDE's online map, available online here:

http://www.mde.state.md.us/programs/Water/TMDL/DataCenter/Pages/8DigitWatershed.aspx

Step 3. Determine the Pre-BMP Load

Step 3a – Determine the Land Use Loading Rates

Next, open the applicable source sector Excel spreadsheet (Agricultural and Forest or Urban Stormwater) and select the third tab, titled "Land use Loading Rates Step 3a." Once that tab is open, locate the land use and loading rates for your 8-digit watershed. There are six land uses for each watershed: forest, crop, pasture, impervious, pervious, and developed. Each of the land uses has loading rates for the amounts of nitrogen, phosphorus, and sediment that are delivered to the Bay. All of the loading rates are expressed as pounds per acre per year.

Select the land use that describes proposed BMP's location. For projects located in urban areas, if the imperviousness of the land being treated is unknown then you may use the 'developed' land use rate. This land use rate combines the average impervious and pervious acres in that 8-digit watershed to calculate a loading rate. If you know the amount of impervious and pervious land that the BMP will treat, you may use each land use loading rate to proportionally calculate the load the BMP will treat. For agricultural BMPs, you may use the 'forest,' 'crop,' or 'pasture' land uses to represent the load that will enter the BMP.

Step 3b – Determine the Pre-BMP Load

Once you have found the loading rates for your BMP's 8-digit watershed, open tab 4, titled "Pre-BMP Load Step 3b." You will use this spreadsheet to calculate the pre-BMP loads for nitrogen (TN), phosphorus (TP), and sediment (TSS) separately. Look at the bolded equation descriptions to find the one that corresponds to your BMP's land use loading rate. You must then enter information into the yellow highlighted cells. The calculated pre-BMP load will be provided in the orange highlighted cell.

If you prefer, you can use the equations located in Box 1 (below) to calculate the pre-BMP load instead of using the Excel spreadsheet. Again, you will need to use these equations to calculate the loads for nitrogen, phosphorus, and sediment separately. Please note that performing the calculations by hand is not required!

Box 1. Instructions for Manually Calculating the Pre-BMP Load

Urban Stormwater BMPs

Equation 1A – Calculate the pre-BMP load for urban BMPs using the "developed" land use loading rate:

Total pre-BMP load = (# developed acres in treatment area) x (developed acre loading rate)

Equation 1B – Calculate the pre-BMP load for urban BMPs using separate impervious and pervious acres:

a) (# impervious acres in treatment area) x (impervious acre loading rate) = y
b) (# pervious acres in treatment) x (pervious acre loading rate) = z
c) Total pre-BMP load = y + z

Agricultural BMPs

Equation 1C – Calculate the Pre-BMP load for agricultural BMPs:

a) (# crop acres in treatment area) x (crop acre loading rate) = y
b) (# pasture acres in treatment area) x (pasture acre loading rate) = z
c) Total pre-BMP load = y + z

Forest BMPs

Equation 1D – Calculate the Pre-BMP load for forest BMPs:

Total BMP load = (# forest acres) x (forest acre loading rate)

Step 4. Determine the Post-BMP Load

Now that you have identified your practice and pre-BMP loads for nitrogen, phosphorous, and sediment, you will calculate the reductions associated with that practice. The crediting process varies based on whether the BMP is classified as an efficiency, load reduction, or land use change**.** Each of these crediting processes has its own worksheet that will calculate the pounds reduced after you fill in the columns highlighted in yellow. Also, the more popular urban stormwater and natural filter practices traditionally implemented through the Trust Fund have their own individual worksheets that will calculate the BMP reduction once the user inputs the values in the yellow highlighted columns. These practices are rain barrel, rain garden, urban tree planting and canopy, forest buffer, upland tree planting, permeable pavement, impervious surface removal, wetland restoration and stream restoration.

If you prefer, you can use the equations located in Box 2 (below) to calculate the post-BMP load instead of using the Excel spreadsheet. Again, you will need to use these equations to calculate the loads for nitrogen, phosphorus, and sediment separately. Please note that performing the calculations by hand is not required!

Box 2. Instructions for Manually Calculating the Post-BMP Load

For efficiency BMPs:

Pounds Reduced = Total Pre-BMP Loading Rate x % BMP Reduction

For load reduction BMPs:

Pounds Reduced = Reduction Factor x BMP Unit

For land use change BMPs:

Pounds Reduced = (Existing land use acreage x existing land use loading rate) – (Converted land use acreage x converted land use loading rate)

Retrofits

If your project is a retrofit of an existing BMP, you must calculate the reduction currently being achieved by the practice using the same steps above. The reduction to be achieved by the retrofit will be the difference between the reduction being currently achieved and the reduction to be achieved once the retrofit is completed.

CCS Grants On-line

After you have calculated the reductions for each of your BMPs, provide the total pounds of nitrogen, phosphorus and sediment reduced in your grant proposal narrative. In addition, please upload the excel spreadsheet(s) you used to calculate the reductions with your input saved as “additional information” in step 3 of the proposal submission.