**Instructions on how to use the Runoff Reduction Scenario Tool**

This accompaniment to the Watershed EZ spreadsheet provides a quick way to plan and budget watershed retrofit implementation plans. The tool is focused around a matrix of potential stormwater BMP retrofit options, ranging from structural BMPs (infiltration areas, wetlands etc.) to simpler tactics (downspout disconnection, impervious area removal etc.).

The tool is intended to be filled out quickly and efficiently, and also be easy to modify as plans evolve. Once the user is satisfied with the data input into the tool, they can take the end result and plug is directly into the Volume Reduction tab on Watershed EZ.

**Instructions:**

* Complete the Baseline and Goal land use portions of Watershed EZ.
* **Open Watershed EZ Scenario Tool** The tool is compatible with most versions of Microsoft Excel
* **Complete Project Information.**  At the top of the page, fill in the **Project Name** and the **Scenario Name**
* **Fill in the Design Rainfall Depth.**  The rainfall depth is also required in Watershed EZ and sets the basis for estimating the volume reduction benefits of various practices. This can be found on the **Summary** tab of Watershed EZ
* **Complete the Scenario runoff volume section.** Using the data computed in Watershed EZ, fill out the runoff volumes from each land use scenario. The runoff volume values can be found at the bottom of the Watershed Data tab.
* **Develop an Implementation Plan.** Whether this is a formal plan or simply a quick planning exercise, begin inputting various volume reduction strategies into the Scenario Tool. Structural BMPs are located on the left side of the page, and nonstructural BMPs are located on the right.
  + **Structural BMPs.** 
    - **BMP Type** - The BMP type is a pull down list where the user selects the type of BMP. The list of BMPs is on the References tab of the worksheet and can be edited by the user.
    - **Soil Type** – Indicate the Hydrologic Soil Group for the area where the BMP is located.
    - **# -** enter the number of BMPs anticipated.
    - **Average Storage Volume –** Enter the average storage volume of each BMP (this is multiplied by the number of BMPs to estimate the total available storage volume). This data is used to compute the total volume available for holding runoff during and after rainfall events.
    - **Total Volume Reduction -** The runoff reduction benefit is calculated using a reference table on the References tab. The credit is based on a percentage of volume reduction compared to the available storage volume. Some BMPs are able to get more than 100% credit based on their ability to infiltrate runoff during a storm event, leading to a more efficient system. The default values in this table are based on the credits determined by the North Carolina Department of Environmental Quality. The data is customizable by the user if local credits warrant revisions, or if the list of BMP choices varies by location.

\*\* If the user chooses to update the BMP table, after editing, click the “update table” button to finalize updates.

* + **Non Structural BMPs**
    - These BMPs do not contain a defined storage volume, but rather decrease runoff through land use change or alternative runoff management. Data entry varies by BMP type, but credits can be adjusted by the user on the references page.
      * Downspout Disconnection is the routing of rooftop runoff to pervious areas rather than directly connecting it to a collection system. The benefit varies based on soil type. The user enters the number of anticipated disconnections and the average roof area per disconnection, the spreadsheet calculates the volume reduction benefit using the expected runoff from the roof top and the volume reduction percentage from the credit table.
      * Green Roof Conversions – by converting a standard roof to a green roof, there is a reduction in total runoff as the plants absorb rainfall leading to increased evapotranspiration. Based on research, the green roof is assumed to have a curve number of 85, compared to a traditional roof with a CN of 98. The volume benefit is the difference in anticipated runoff between those two curve numbers for the area converted.
      * Impervious Area Removal – the benefit is computed by calculating the difference in runoff volume between impervious area and open space of a given soil type.
      * Stream Restoration – the user enters the new floodplain area created during stream restoration projects. Although all stream restoration project have watershed benefits, projects which only armor the stream to protect it from further erosion are assumed to have negligible volume reduction benefits, only those projects which also add floodplain are assumed to reduce the total transport of pollutants. The default credit is a reduction of 0.2” of runoff for the area converted. The user can edit this value by changing the equation in the Volume Reduction column.
      * Tree Planting – increasing tree canopy adds additional uptake and canopy interception in the beginning of rainfall events. Based on numerous research reports, the benefit is set as 0.1” of rainfall interception. The volume reduction credit is calculated by calculating the total canopy area of the new trees and the 0.1” of interception.

**BMP Costs** – the construction cost of BMPs is used to generate a preliminary cost estimate for the user. The references tab includes a table of average construction costs for each type of BMP included in this tool. This table can also be edited and customized by the user to add or edit BMP types and average construction costs.

Both tables on the References tab include User Defined cells. These rows can be used to expand the library of available BMPs.

The Scenario sheet continually completes calculations as data is entered. As the user completes the sheet, they can take the final runoff reduction value calculated at the bottom of the page and insert it into the Volume Reduction tab in Watershed EZ.