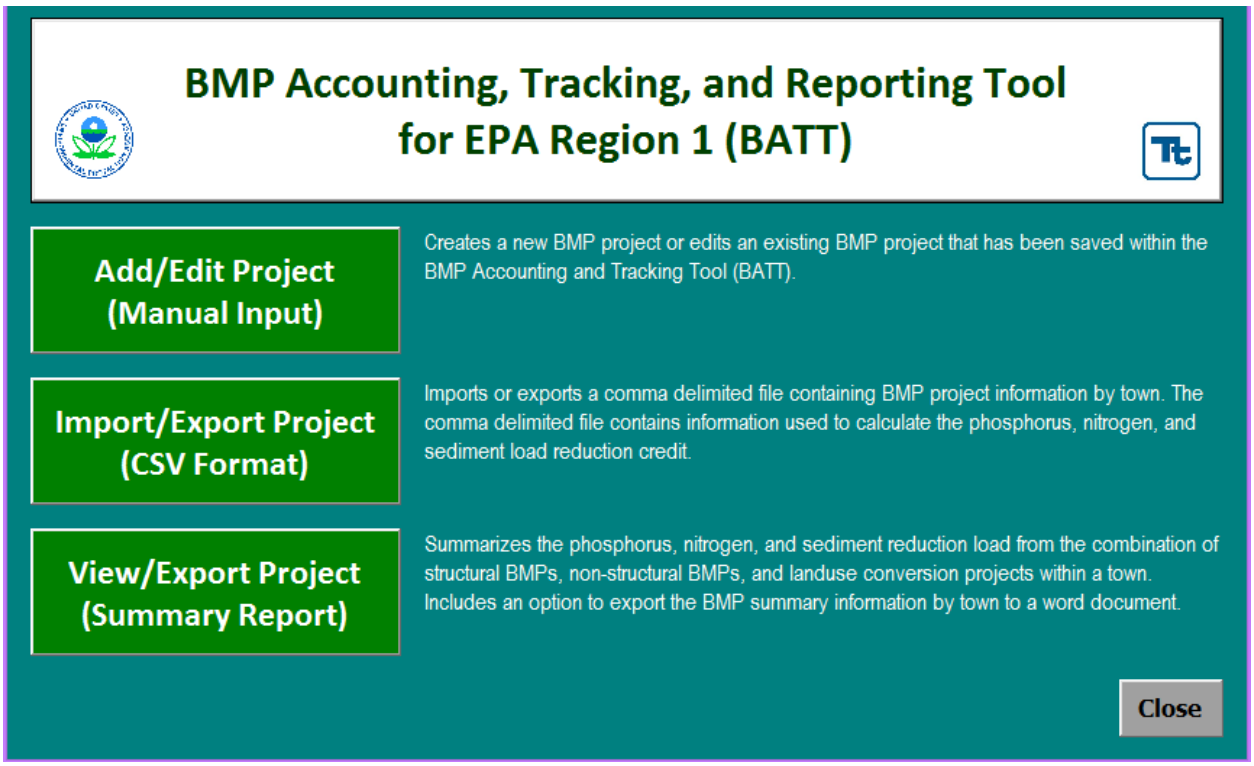
Supplemental
BATT User Guide



Stephanie Cappelli
April Locke
Jessica Wey

Worcester Polytechnic Institute
students working in collaboration
with Stantec, LLC.

Introduction:

This User Manual was created by Worcester Polytechnic Institute (WPI) students as part of their fulfillment of their Major Qualifying Project (MQP). The students worked in collaboration with Stantec, LLC. in understanding the fundamentals of the Best Management Practices (BMP) Accounting and Tracking Tool (BATT). However, all views herein are the students' alone and should not be affiliated with WPI or Stantec.

The students found a supplementary BATT User Guide necessary for users unfamiliar with the interface, looking for best tips to install and understand the said software. To provide such materials, the students created this manual as an add-on to the EPA BATT User Guide, a more tutorial approach.

Developed by:
TETRA TECH
10306 Eaton Place, Suite 340
Fairfax, VA 22030

Developed for:
EPA
USEPA Region 1 - New England
5 Post Office Square, Boston, MA 02109

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Launch BATT

Steps to Set Up BATT on Computers

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Tips & Tricks

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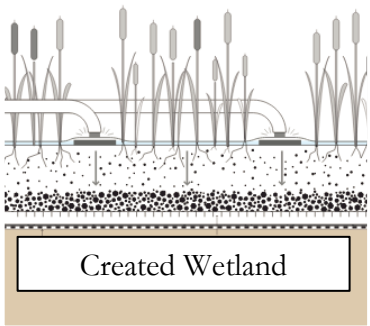

Guide to BMPs

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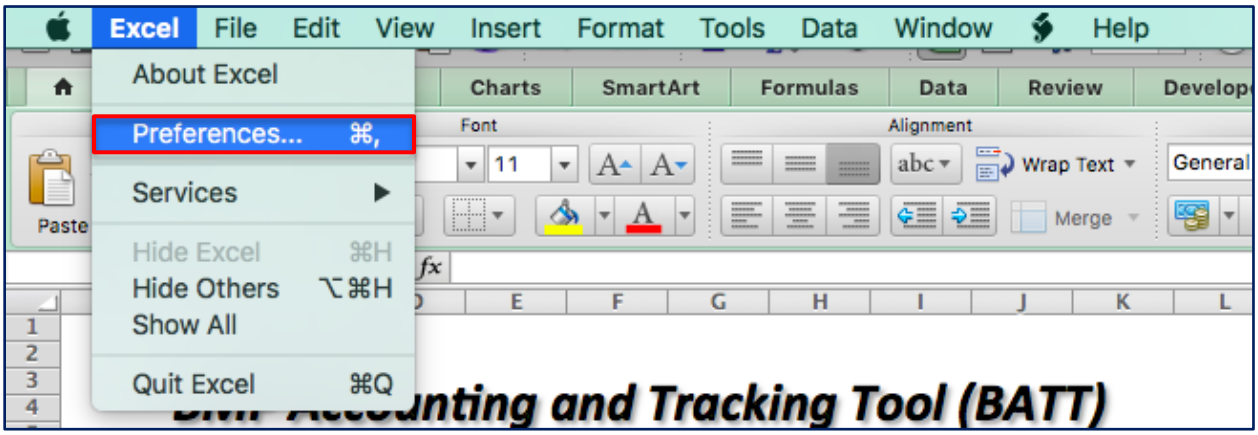
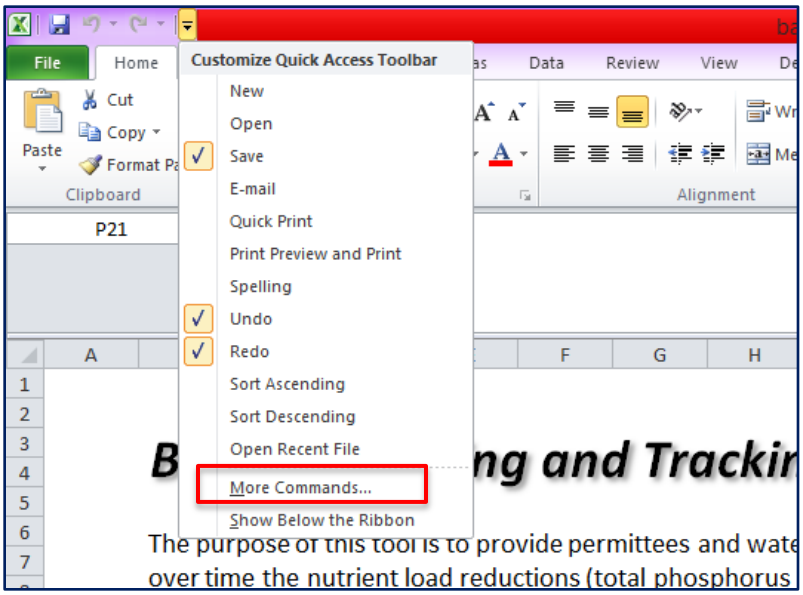
Steps to Set Up BATT on Computers

To run properly, BATT is designed to work on the 2013 versions of Microsoft Word and Excel. If the user does not have these versions, his or her computer will likely be missing at least one reference library that BATT refers to. Once BATT is opened, the user must select "Enable Macros". After doing so, the user will need to start the process of unselecting missing reference libraries. The steps are different in the beginning between Mac and PC interfaces, but converge by the end. Instructions are provided for both. The directions are as follows:

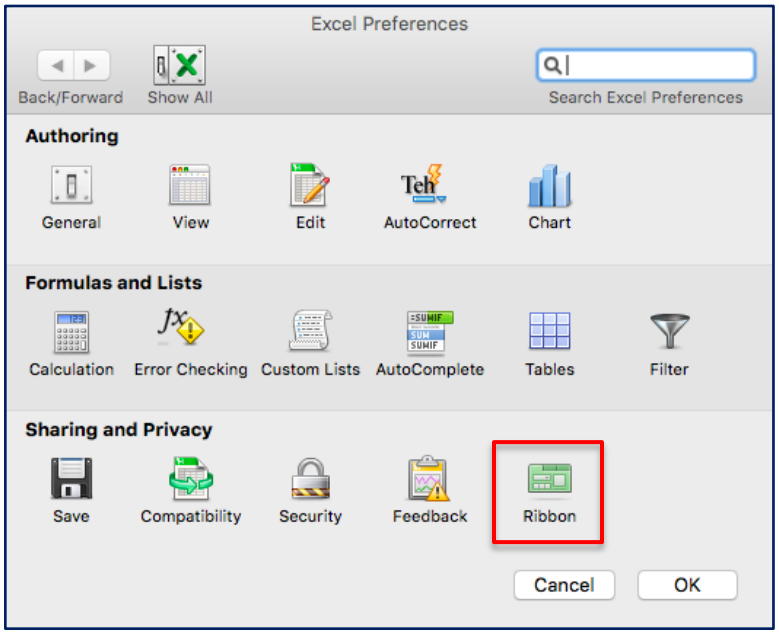
Step 1 (Mac): Hover over "Excel" next to the Apple symbol, and select "Preferences"



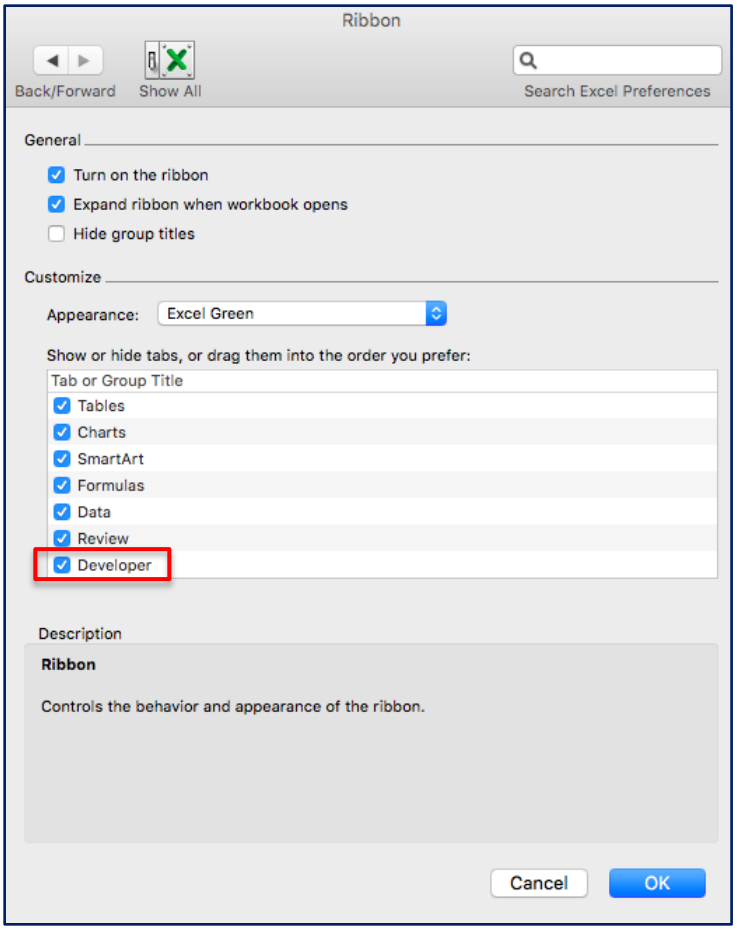
Step 1 (PC): Hover over the down arrow near "Save," and select "More Commands" (Skip to Step 3 for PC)



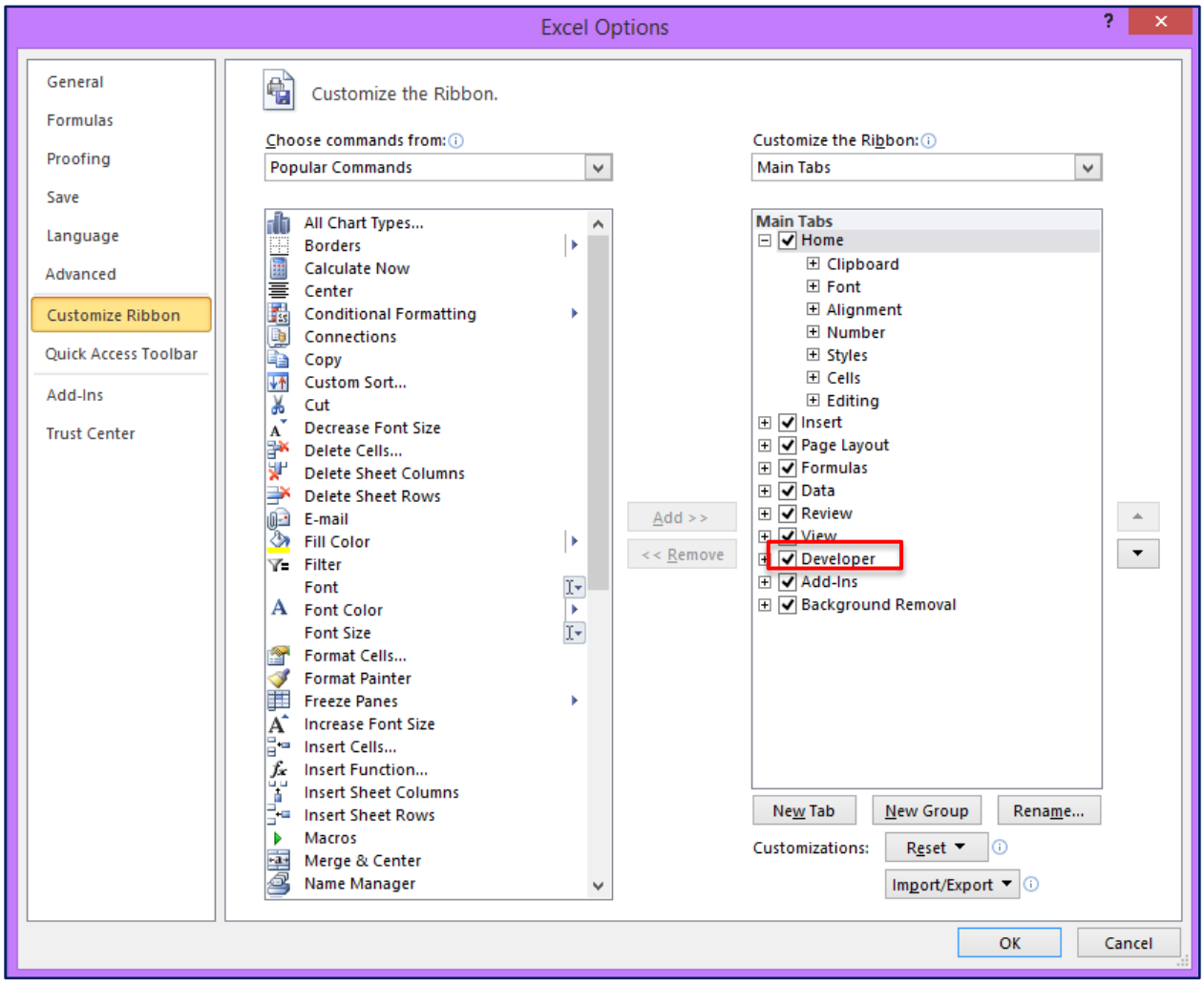
Step 2 (Mac): Select "Ribbon" in the Excel Preference options



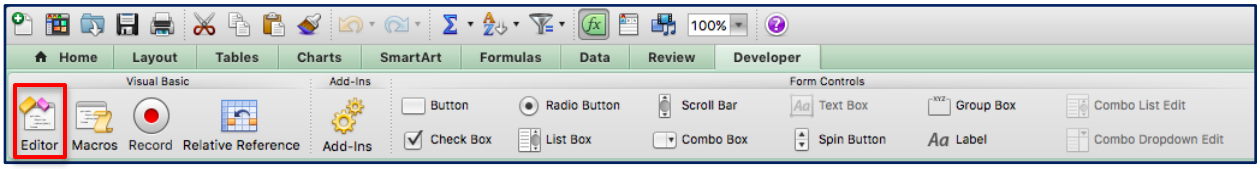
Step 3 (Mac): Make sure that "Developer" is checked, and hit "OK"



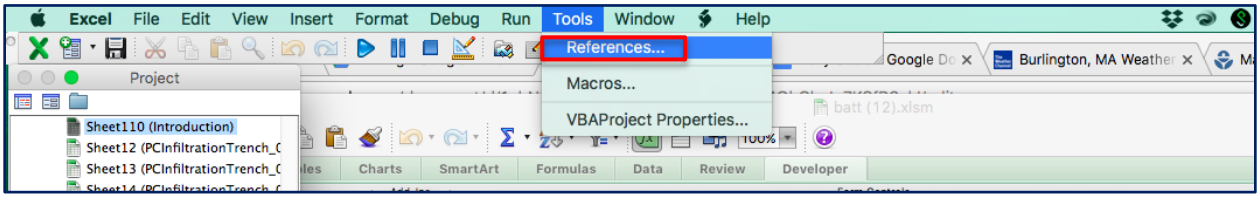
Step 3 (PC): Select "Customize Ribbon" in Excel Options box. In "Main Tabs" options on the right pane, make sure "Developer" is clicked. Click "OK"



Step 4: In the "Developer" tab, select "Editor"

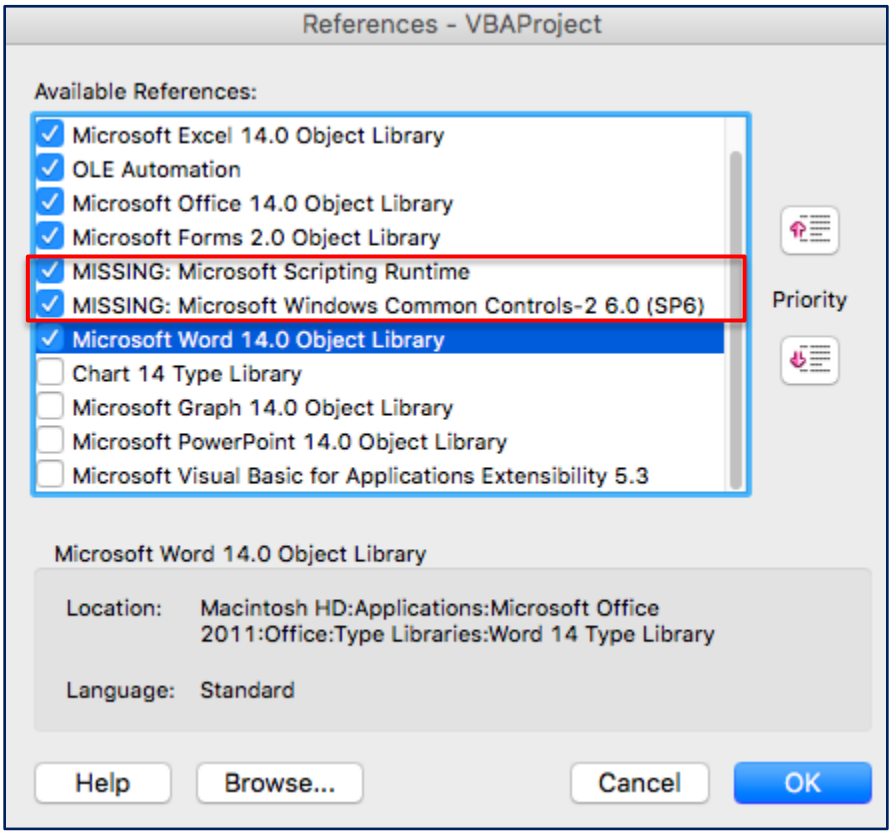


Step 5: Under "Tools," select "References"



Step 6: The user will notice that there are missing References. Uncheck the missing references and hit "OK". In this case, the following would be unselected:

a. MISSING: Microsoft Scripting Runtime
b. MISSING: Microsoft Windows Common Controls - 2 6.0 (SP6)

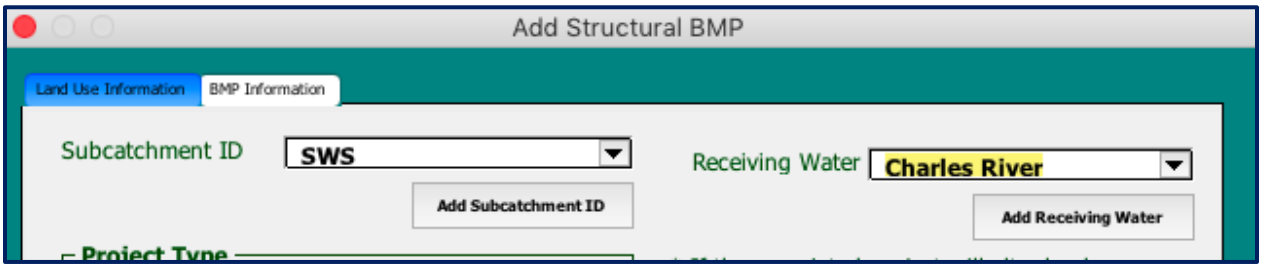


Once both missing libraries are unchecked, BATT will only be referring to functioning libraries and BATT runs properly.

Tips & Tricks

Tip 1: Subcatchment ID and Receiving Water

Subcatchment ID and Receiving Water are values entered manually and primarily for keeping track of projects in a saved list. BATT does not supply libraries with options for these categories and they do not affect the result. The receiving water should be the general watershed where the project is located (Charles River, Mystic River, etc.). The user can create any name for the Subcatchment ID.

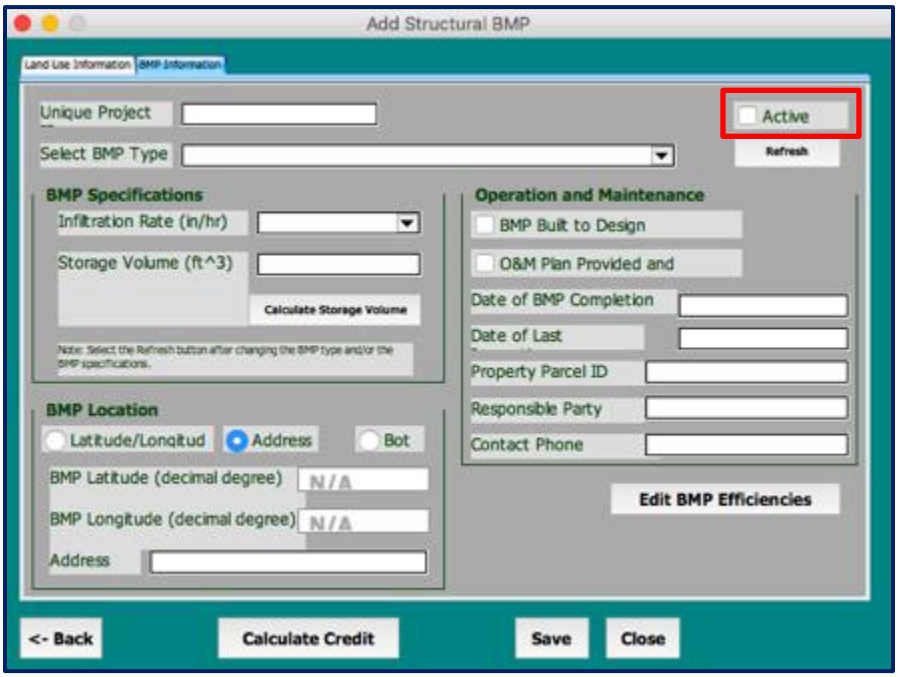


Tip 2: Pervious-only Subcatchments are Not Credited

Subcatchments entered into the first tab of BATT "Land Use Information" that contain only pervious area will not produce a credit in BATT. At least a small amount of impervious area must be entered to calculate credits.

Tip 3: Active Box Requirement for Functionality

After entering all of the specifications for the BMP, the user must first check the "Active" box for this BMP in order to execute the "Calculate Credit" function.



Tip 4: For accurate analysis of impervious area conversions, use MS4 Permit.

BATT does not credit changes in impervious and pervious areas properly during site retrofits, when the land use group stays the same. Therefore, to obtain the proper credit, the developer must use Attachment 3 of Appendix F. Attachment 3 includes Table 3-28, "Cumulative Reduction in Annual Stormwater Phosphorus Loads," in percentages for impervious area converted to pervious area for each soil type which should be factored into the equation.

Tip 5: Unknown HSGs are Categorized as HSG C

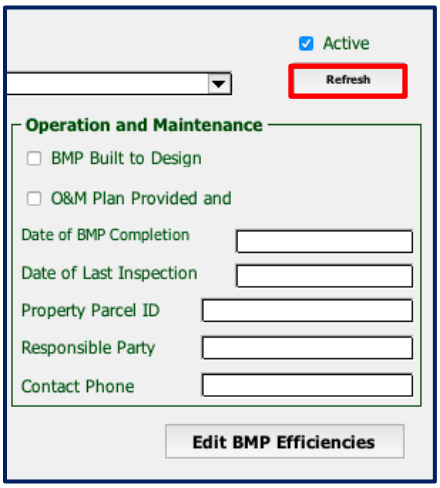
This is confusing, since several areas in the permit can give different information. However, the "Response to Comments" to Appendix F changed the unknown soil group form C/D to C.

Tip 6: Non-Structural BMP: Sweeping Technologies

The methodology for calculating credits in BATT does not match what is specified in Appendix F. The BATT method does not allow for an "Annual Frequency Factor" of total months of the year swept over twelve months. BATT only allows for the initial frequency of weekly, monthly, or twice per year. If the municipality sweeps for a certain amount of months of the year, the user must calculate this credit with Appendix F and not BATT.

Tip 7: Using the "Refresh" Button

If BMP conditions are changed such as the infiltration rate, storage volume, acreage, or BMP type, the user must click the "Refresh" button under the "Active" box in order to obtain a different credit. When changing land use conditions on the previous page, it is not necessary to click the "Refresh" button.



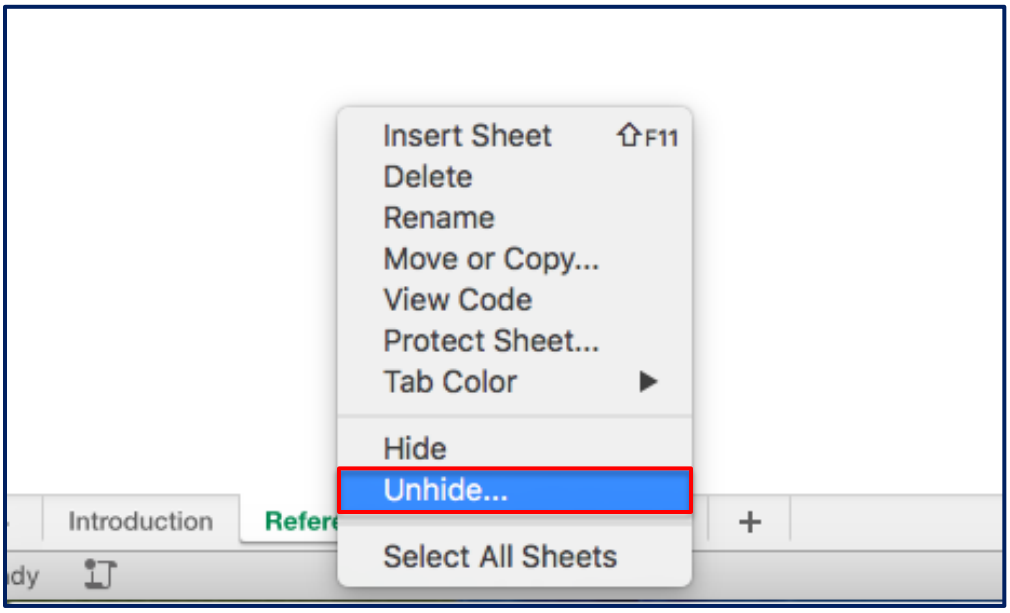
Tip 8: Non-structural BMP: No Applications of Fertilizer with Phosphorus Not Credited in BATT

Because Massachusetts has implemented a general ban on fertilizer with phosphorus, the EPA has credited each municipality already with a standard value in pounds per year assuming no fertilizers with phosphorus. To find a municipalities' credit and an explanation of the calculation, go to the "Response to Comments" document of the MS4 permit.

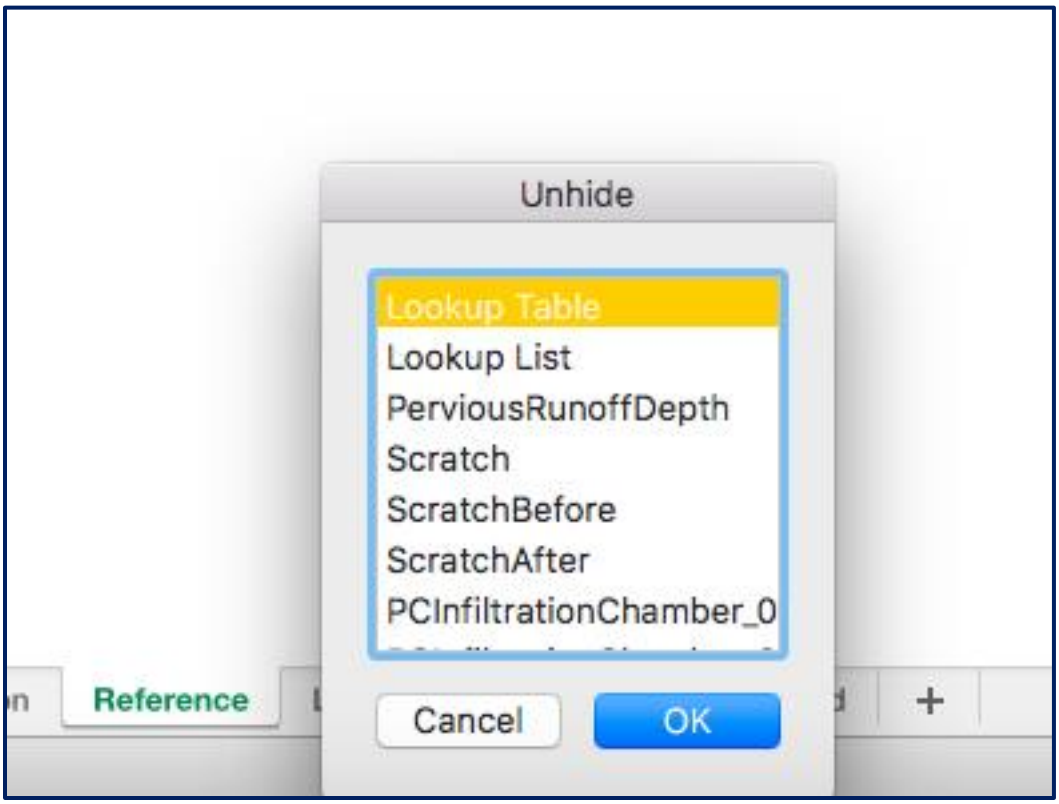
Tip 9: The Reference Tabs in BATT can be unhidden

The "Reference" tab to the right of the main "Introduction" screen in BATT contains useful information detailing the foundations of BATT calculations. When first opening the Reference tab, brief instructions on how to activate necessary libraries are given, similar to the first chapter of this User Guide. Then a description of BMPs is given and how they are categorized in BATT. Design storage volume (DSV) equations for each BMP are also given. Additionally, right clicking on the reference tab, as demonstrated in Step 1 below, will "Unhide" a variety of reference tables containing information in Appendix F that dictates BATT reduction calculations. Primarily the tabs contain tables of percentages representing performance curves for each BMP. Various tabs provide a layout of information from saved BATT calculations including efficiency percentages. A detailed list of each reference tab and information provided within is laid out below along with instructions to unhide the reference tabs.

1) Right click the bottom References Tab and click "Unhide."



2) A list will come up including Lookup Tables and Performance Tables for each BMP.



Reference Tab Name	Description
Look Up List	Gives information about the towns available in BATT, a land use list, HSG List, available structural BMPs in BATT, infiltration rates, non-structural BMPs list, release rate, sweeper technology choices, nutrient removal efficiencies for organic waste/leaf litter, nutrient removal efficiencies for catch basin cleaning, nutrient removal efficiencies for different types of street sweeping technologies
Land Loading Rate	Gives the nutrient loading rate for each type of land use in lb/ac/yr
Database Structural BMPs	Additional information about saved structural projects including nutrient removal efficiency percentages; info only appears if project is saved
Database Non-Structural BMPs	Additional information about saved non-structural projects including nutrient removal efficiency percentages; info only appears if project is saved
Database Land Use Conversions	Additional information about saved land use conversion projects including nutrient removal efficiency percentages; info only appears if project is saved
Scratch	Organizes information entered in past BATT projects
Scratch Before	Headings to table of Scratch
Scratch After	Headings to table of scratch
Pervious Runoff Depth	Gives runoff depths for each category of HSG based on the rainfall depth
PCInfiltrationChamber_0.17-8.27	Gives BMP Performance Tables for various infiltration rates (0.17, 0.27, 0.52, 1.02, 2.41, 8.27) of Infiltration Chambers
PCInfiltrationTrench_0.17-8.27	Gives BMP Performance Tables for various infiltration rates (0.17, 0.27, 0.52, 1.02, 2.41, 8.27) of Infiltration Trenches
PCInfiltrationBasin_0.17-8.27	Gives BMP Performance Tables for various infiltration rates (0.17, 0.27, 0.52, 1.02, 2.41, 8.27) of Infiltration Basins
PCIADisconnectStorage_1.1-8.1	Provides the nutrient reduction percentages per each Storage volume to impervious area ratio (1:1, 2:1, 4:1, 6:1, 8:1) and Hydraulic Soil Group. Organized by amount of days the water is retained in BMP before drained.

PCSandFilter	Provides the long-term nutrient load reductions based on the Sand Filter BMP Capacity
PCBiofiltration	Provides the long-term nutrient load reductions based on the Biofiltration BMP Capacity
PCWetPond	Provides the long-term nutrient load reductions based on the Wet Pond BMP Capacity
PCDryPond	Provides the long-term nutrient load reductions based on the Dry Pond BMP Capacity
PCGravelWetland	Provides the long-term nutrient load reductions based on the Gravel Wetland BMP Capacity
PCGrassSwale	Provides the long-term nutrient load reductions based on the Grass Swale BMP Capacity
PCDisconnect	The ratio of disconnected impervious area to pervious area related to the nutrient reduction percentages of each HSG

Guide to BMPs

Structural BMPs

Infiltration Trench

BMPs labeled as a trench: Porous pavement without permeable liner, subsurface infiltration, tree filter, dry well, leaching catch basin

- *Differentiating Characteristics:* Infiltration into subsoils instead of redirection, storage container (pipe, chamber, galley), provides temporary storage using void spaces

Infiltration Basin

BMPs labeled as a basin: Bioretention areas, rain gardens, wet pond, dry pond, gravel wetland (each without impermeable liners)

- *Differentiating Characteristics*: Infiltration into subsoils instead of redirection, stores runoff by standing water before infiltration

Bioretention

BMPs labeled as bioretention: Biofiltration, rain gardens (each with underdrains)

- *Differentiating Characteristics*: Primary removal mechanism is soil media filtering, water passes through without retention, Shallow depressions that contain soil, plants, and microbes

Gravel Wetland

BMPs labeled as gravel wetland: Various created wetlands based on the design

- *Differentiating Characteristics*: Gravel Internal Storage Reservoir (ISR), Retention time of at least 24 hours

Enhanced Bioretention

BMPs labeled as enhanced bioretention: Biofiltration, rain garden based on the design

- *Differentiating Characteristics*: Primary removal mechanism is soil media filtering, washed stone internal storage reservoir (ISR), retention time of at least 24 hours

Porous Pavement

BMPs labeled as porous pavement: Porous asphalt, porous concrete, porous pavements must have impermeable liner/underdrain

- *Differentiating Characteristics*: Porosity in paved surface allows filtration to an underdrain

Wet Pond/Created Wetland

BMPs labeled as wet pond/created wetland: Some created wetlands depending on design, wet pond, wet basin

- *Differentiating Characteristics*: Primary removal mechanism is settling and vegetative treatment, stormwater remains until displaced by incoming storm runoff

Extended Dry Detention Pond

BMPs labeled as dry pond: Dry detention basin, extended dry detention pond

- *Differentiating Characteristics*: Stormwater treatment through limited settling, rapid displacement, no vegetation required
- Dry detention basin (limited settling of sediments, designed to empty in less than 24 hours); Extended dry detention basin (provides a minimum detention time of 24 hours, removal of sediment can be enhanced with addition of shallow marshes, micropools, or forebays)

Grass Swale

BMPs Labeled as Grass Swale: Grass swale, vegetated swale, conveyance BMPs

- *Differentiating Characteristics*: Primary removal mechanism is conveyance, water must move across swale for treatment, infiltration is a factor (rate assumed in BATT)

Non-structural BMPs

Impervious Area Disconnection with Storage

BMPs labeled as impervious area disconnection with storage: Rain barrel, cistern, rainwater harvester

- *Differentiating Characteristics*: Primary mechanism is to collect runoff from an impervious area, storing it in a container, and releasing it to a pervious area after a time delay

Impervious Area Disconnection without Storage

BMPs labeled as impervious area disconnection without storage: Rain gutter downspout

- *Differentiating Characteristics*: Discharge of rainwater from an impervious area to a pervious area

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