

The Spreadsheet Tool for Estimating Pollutant Loads (STEPL)



STEPL Training Workshop
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Introductions

- Khalid Alvi – Tetra Tech modeler, STEPL technical support
- Meghan Klastic – U.S. EPA
Technical Contact, National Support
- Lehman Stuart – U.S. EPA
Technical Contact, National Support



Agenda

- Overview of STEPL
- Using the model
 - Navigating worksheets
 - Basic inputs & outputs
- Urban BMP Tool
- Gullies and Streambanks
- BMP Calculator
- STEPL Input Data Server
- STEPL Updates (Existing and New BMPs)



STEPL Overview



What is STEPL?

- **STEPL**– **S**preadsheet **T**ool for **E**stimating **P**ollutant **L**oad
- A customized MS Excel spreadsheet model designed to support planning level decision-making
 - What are the pollutant average annual loading from the non-point sources?
 - How effective are BMPs in reducing pollutant loadings?



What is STEPL? – contd.

- Calculates nutrient (N, P, and BOD pollutants) and sediment loads by land use type and aggregated by watershed
- Calculates load reductions as a result of implementing BMPs
- Data driven and highly empirical
- A customized MS Excel spreadsheet model
 - Simple and easy to use
 - Formulas and default parameter values can be modified by users (optional) with no programming required



STEPL Users?

- Basic understanding of hydrology, erosion, and pollutant loading processes
 - Hydrology → Curve Number approach
 - Erosion → USLE and sediment delivery ratio, urban runoff concentration
 - Pollutant load → runoff concentration
- Knowledge of environmental data (e.g., land use, agricultural statistics, and BMP efficiencies)
- Familiarity with MS Excel



How STEPL is Used

- Originally developed to assist State NPS project managers report load reductions to EPA
 - Performance measures for N, P, and Sediment
 - Data entered into the Grant Reporting & Tracking System (GRTS)
- Also used by other federal/state/local partners, environmental consultants, researchers, etc.
 - Primary model used for NPS project planning



Progression of STEPL

- First release Oct 2001
- Several enhancements over the years
 - BMP calculator
 - Ability to add a BMP
 - Partial BMP applications
 - Groundwater
 - Gullies & streambanks
 - Coming soon: New BMPs and Ecoli



STEPL Basic Tools

- STEPL
 - Calculates load for different sources at source and watershed level
 - User can specify and update BMP list
 - Urban BMP Tool for stormwater BMPs
- BMP calculator
 - Calculates the “combined efficiency” of multiple BMPs
 - use when more than 1 type of BMP is applied on a single land use type
- Input Data Server
 - Map interface to generate input data for the model at the HUC12 level



Other Tools

- BMP Efficiency Estimator
- Region 5 Model



Input Data Requirements

- Watershed-level data
 - County & Weather Station
 - Land use distribution
 - Agricultural animal population and number of months manure applied
 - Septic system information
- Land cover specific
 - BMP type and % area applied
 - Urban Land use types for urban BMPs



STEPL System Defaults

- These data are derived from user inputs, but can be modified
 - Soil information (based on county)
 - Curve Numbers (land use/soil group)
 - Urban land use distribution
 - Nutrient concentration in runoff/shallow groundwater
- Other optional input data
 - Special sediment sources from gullies and impaired streambanks



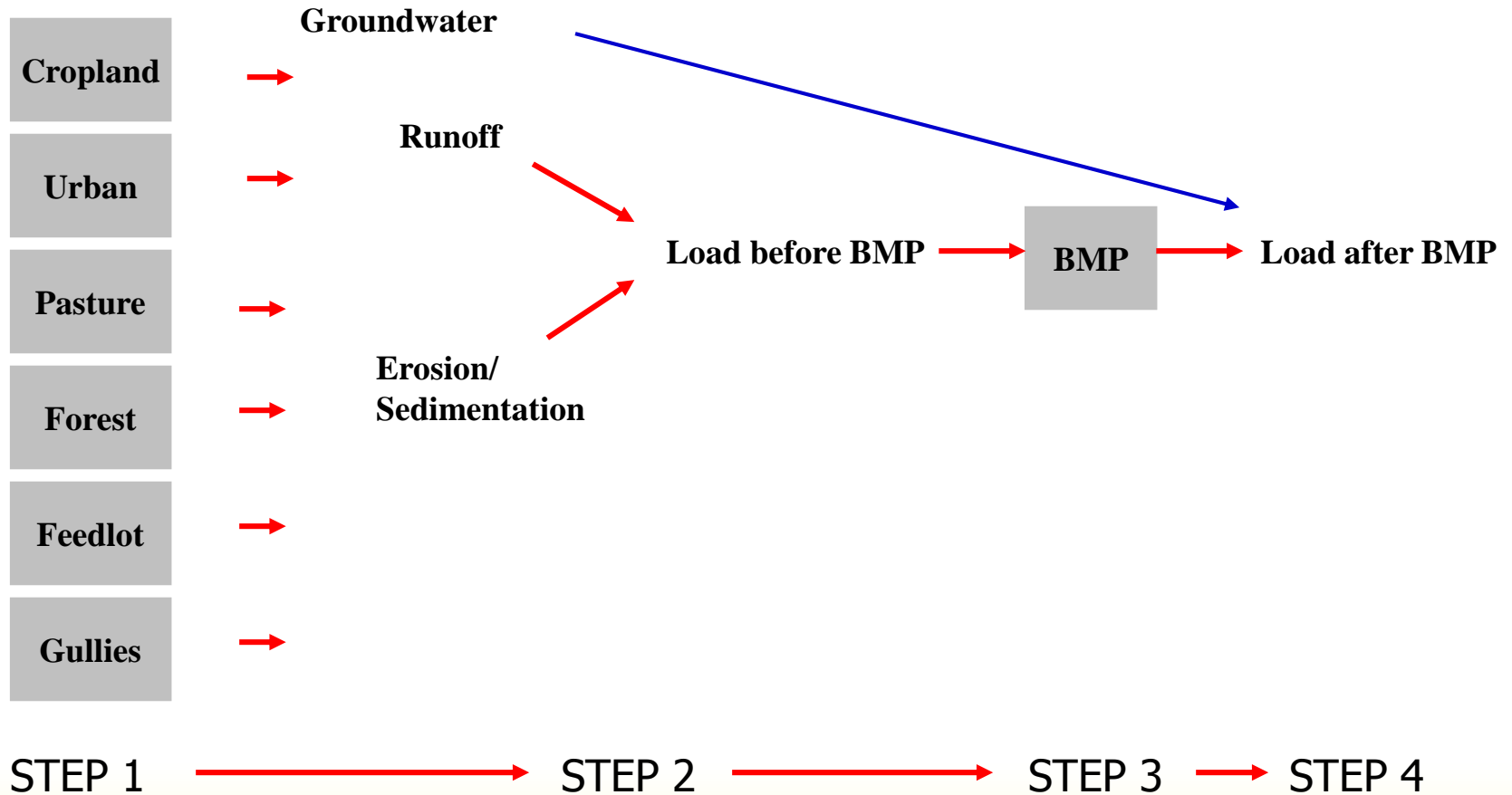
Notes on Input Data

- Land use distribution is critical
- Modify inputs with current, local data where available
- Focus on Sources being addressed by project
 - For example, Agricultural data will not impact results for urban BMPs
 - Will affect Total Loads but not the Load Reduction amount
- % Area Applied: calculate the proportion of acreage treated by the BMP(s) for that land use type



Process

Sources



STEPL Website

<http://it.tetrattech-ffx.com/steplweb/>

The image shows a screenshot of the EPA STEPL website. The browser window displays the URL [http://it.tetrattech-ffx.com/steplweb/models\\$docs.htm](http://it.tetrattech-ffx.com/steplweb/models$docs.htm). The website header includes the EPA logo and navigation tabs: **LEARN THE ISSUES**, **SCIENCE & TECHNOLOGY**, **LAWS & REGULATIONS**, and **ABOUT EPA**. The main content area is titled **Models and Documentation** and includes links to **Slide Shows and Tutorial for STEPL Training 2013** (last updated 12/17/2013) and **STEPL 4.3** (last updated 02/05/2015). A red box highlights the **STEPL 4.3** link and the **STEPL 4.3 Installation Package** link below it. A note at the bottom states: *Note: This update was to fix a run-time error 1004 and this version*. The left sidebar contains links to **Home**, **STEPL Data Server for Sample Input Data**, **Models and Documentation** (highlighted with a red box), and **Frequently Asked Questions**. A circular logo for the **Spreadsheet Tool for Estimating Pollutant Loads (STEPL)** is also visible.

System Requirements

- Windows operating system
- MS Excel 2010 or 2013
- 14 MB hard disk space
- Not Compatible with Windows 7 operating system and MS Excel 2007 combination



STEPL Installation

- Download the latest STEPL program file from:
[http://it.tetrattech-ffx.com/steplweb/models\\$docs.htm](http://it.tetrattech-ffx.com/steplweb/models$docs.htm)
- Run the setup.exe to install (must have admin rights)
- Important: Install STEPL in a folder you have write access to



Running STEPL

- Know before you begin:
 - Number of watersheds
 - Number of gullies/streambanks

Tip: enter more than you need as placeholders

- Check box to turn off Microsoft compatibility checker
- Enable Macros
 - In Excel 2010 or 2013, Click on File menu > Options > Trust Center > Trust Center Settings > Macro Settings



STEPL Resources

- STEPL Installation Package includes:
 - STEPL User Guide
 - BMP Definitions
 - Sample Worksheets
 - Release Notes
 - BMP Calculator Guide
 - Support Worksheets contain input reference data



STEPL Resources, cont.

- Also on the website:
 - Frequently Asked Questions
 - STEPL Slide Shows & Tutorials
 - Alternative Models Document
 - Region 5 Model and documentation
- STEPL Support:
stepl@tetrattech.com

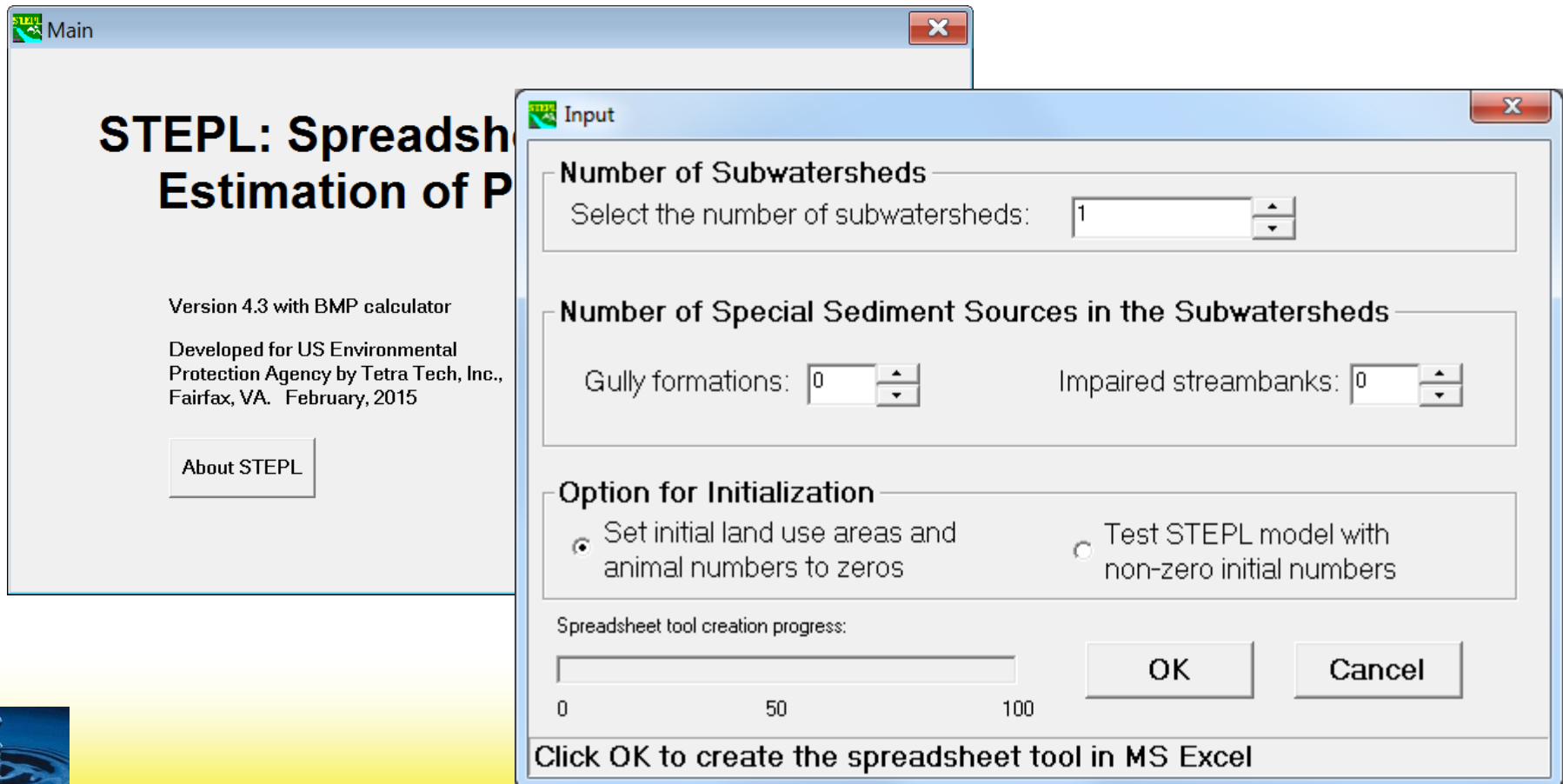


How to Use STEPL



STEPL Main Program

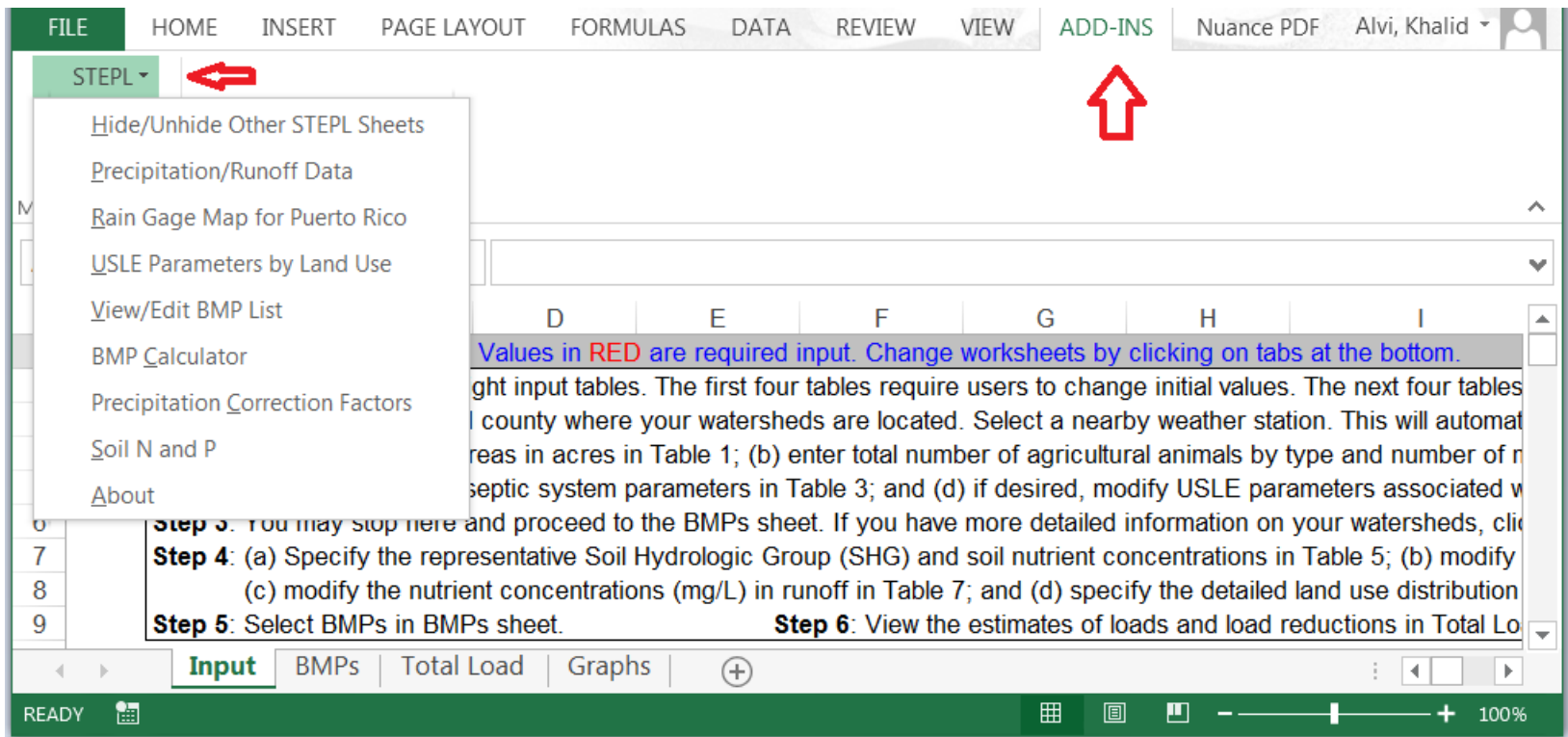
- Run STEPL executable program to create and customize spreadsheet dynamically



The image shows the STEPL Main Program interface. The 'Main' window displays the title 'STEPL: Spreadsheet Estimation of P' and version information: 'Version 4.3 with BMP calculator', 'Developed for US Environmental Protection Agency by Tetra Tech, Inc., Fairfax, VA. February, 2015'. An 'About STEPL' button is visible. Overlaid on this is the 'Input' dialog box, which contains the following fields and options:

- Number of Subwatersheds**: A text box with the label 'Select the number of subwatersheds:' and a spinner box set to '1'.
- Number of Special Sediment Sources in the Subwatersheds**: Two spinner boxes. 'Gully formations' is set to '0' and 'Impaired streambanks' is set to '0'.
- Option for Initialization**: Two radio buttons. The first is 'Set initial land use areas and animal numbers to zeros' (selected). The second is 'Test STEPL model with non-zero initial numbers'.
- Spreadsheet tool creation progress**: A progress bar showing 0% completion, with a scale from 0 to 100.
- Buttons**: 'OK' and 'Cancel' buttons.
- Footer**: A message 'Click OK to create the spreadsheet tool in MS Excel'.

Customized Menu



- To view the STEPL menu in Excel 2013, click on the Add-Ins tab

TIP: Make sure macros are enabled first



Macro Settings

1

File Home Insert Page Layout Formulas Data Review View Developer Add-Ins

Save Save As Open Close

Info

Recent New Print Save & Send Help

Options Exit

2

Excel Options

General Formulas Proofing Save Language Advanced Customize Ribbon Quick Access Toolbar Add-Ins Trust Center

3

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Microsoft Excel Trust Center

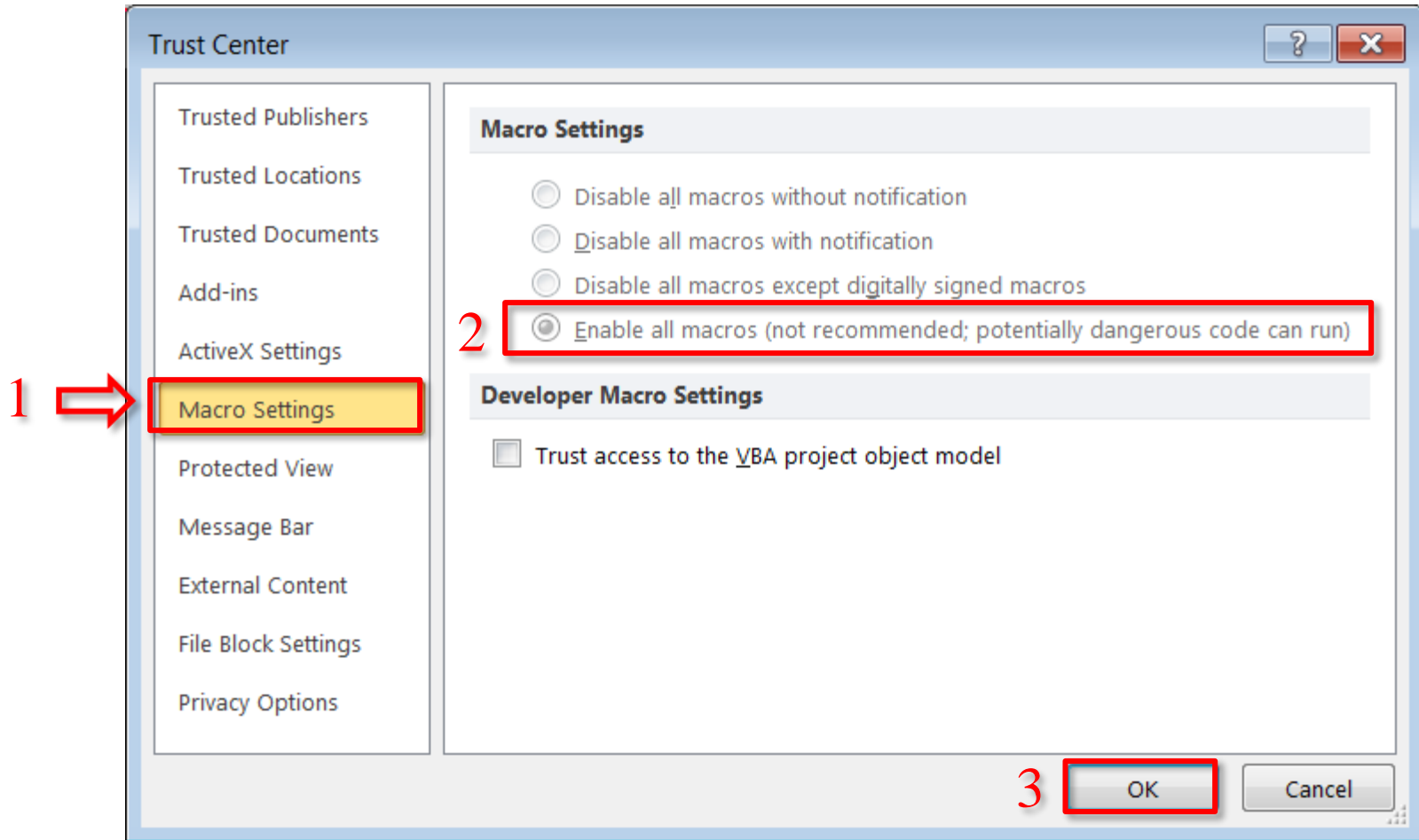
The Trust Center contains security and privacy settings. These settings help keep your computer secure. We recommend that you do not change these settings.

4

Trust Center Settings...

OK Cancel

Macro Settings



STEPL Spreadsheet

Sample.xlsm - Excel

FILE HOME INSERT PAGE LA FORMUL DATA REVIEW VIEW DEVELO ADD-IN Nuance TEAM Alvi, K...

A1

STEPL Input Sheet: Values in RED are required input. Change worksheets by clicking on

This sheet is composed of eight input tables. The first four tables require users to change initial va

Step 1: Select the state and county where your watersheds are located. Select a nearby weathe

Step 2: (a) Enter land use areas in acres in Table 1; (b) enter total number of agricultural animals
(c) enter values for septic system parameters in Table 3; and (d) if desired, modify USLE

Step 3: You may stop here and proceed to the BMPs sheet. If you have more detailed information

Step 4: (a) Specify the representative Soil Hydrologic Group (SHG) and soil nutrient concentration
(c) modify the nutrient concentrations (mg/L) in runoff in Table 7; and (d) specify the detail

Step 5: Select BMPs in BMPs sheet. **Step 6:** View the estimates of loads and l

☐ Treat all the subwatersheds as p

State Alabama **County** Autauga **Weather Station** AL ABBEVILLE 1 NNW

Input BMPs Total Load Graphs

Composed of four worksheets

Type over Red text only

- Do not type in cells with black text

Sample.xlsm - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Developer Add-Ins Nuance PDF Team

A1

State County Weather Station (for rain correction factors)

Alabama Autauga 0 Default

Rain correction 0.814

1. Input watershed land use area (ac) and precipitation (in)

Watershed	Urban	Cropland	Pastureland	Forest	User Defined	Feedlots	Feedlot Percent Paved	Total	Annual Rainfall
W1	200	200	200	200	0	10	0-24%	810	60

2. Input agricultural animals

Watershed	Beef Cattle	Dairy Cattle	Swine (Hog)	Sheep	Horse	Chicken	Turkey	Duck	# of months manure applied
W1	100	100	100	100	100	100	100	100	4
Total	100	100	100	100	100	100	100	100	

3. Input septic system and illegal direct wastewater discharge data

Watershed	No. of Septic Systems	Population per Septic System	Septic Failure Rate, %	Wastewater Direct Discharge, # of People	Direct Discharge Reduction, %
W1	600	2.43	2	0	0

Input BMPs Total Load Graphs BMPList

Ready 100%

BMPs Worksheet

Urban BMP Tool

Gully and
Streambank Erosion

1. BMPs and efficiencies for different pollutants on CROPLAND, ND=No Data

Watershed	Cropland						
	N	P	BOD	Sediment	BMPs		% Area BMP Applied
W1	0.485	0.55	ND	0.405	<input checked="" type="radio"/> Contour Farming		100
W2	0.1	0.3	ND	0.35	<input checked="" type="radio"/> Diversion		100
W3	0	0	0	0	<input checked="" type="radio"/> No BMP		100

- Each land use type within each watershed can have one BMP
- Specify % Area BMP Applied



Total Load Worksheet

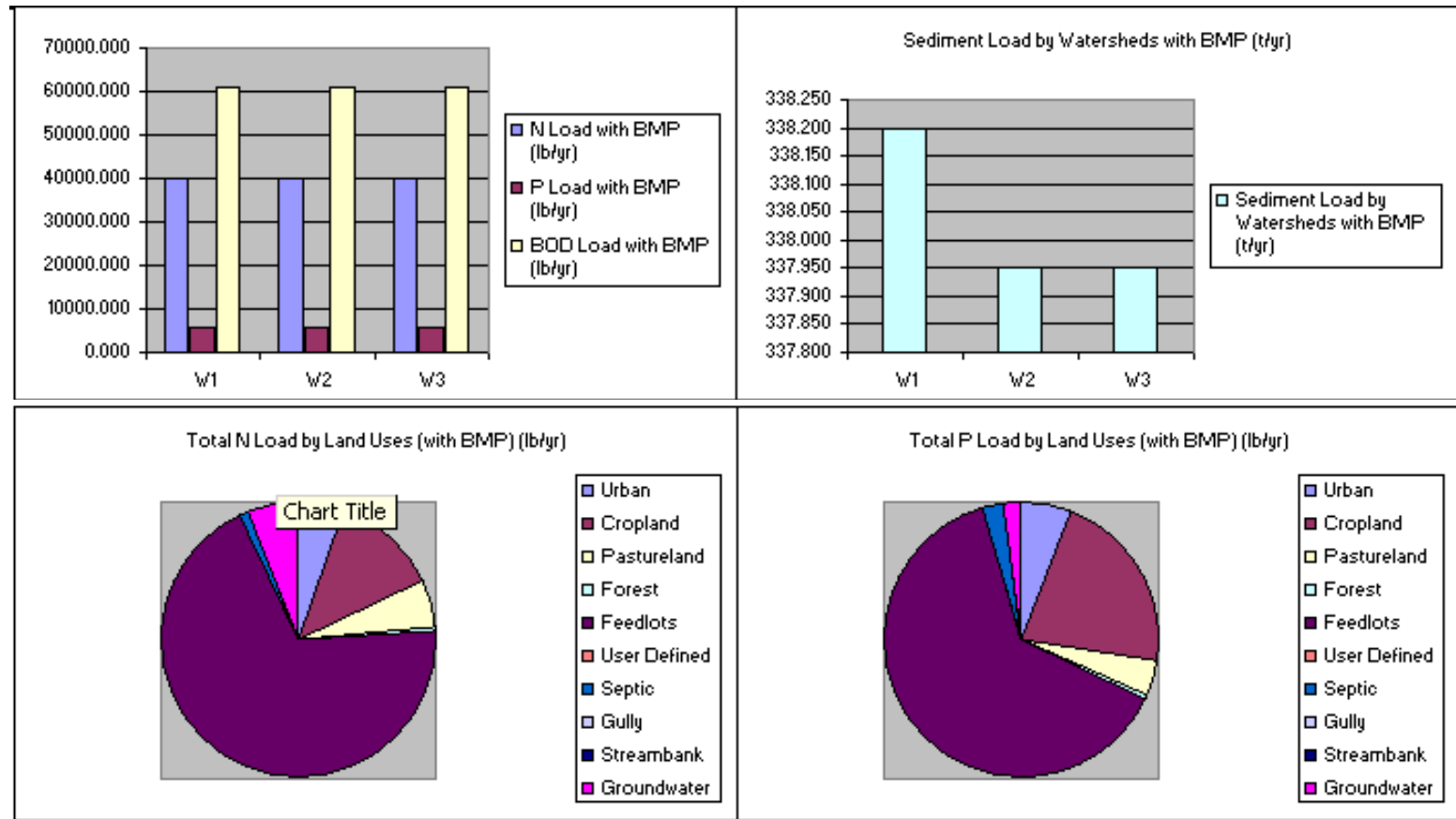
1. Total load by subwatershed(s)

Watershed	N Load (no BMP)	P Load (no BMP)	BOD Load (no BMP)	Sediment Load (no BMP)	N Reduction	P Reduction	BOD Reduction	Sediment Reduction
	lb/year	lb/year	lb/year	t/year	lb/year	lb/year	lb/year	t/year
W1	39888.8	5615.6	60882.3	342.9	8.6	3.3	17.1	4.7
W2	39879.8	5612.2	60864.2	338.0	0.0	0.0	0.0	0.0
W3	39879.8	5612.2	60864.2	338.0	0.0	0.0	0.0	0.0
Total	119648.4	16839.9	182610.8	1018.8	8.6	3.3	17.1	4.7

Each row of results corresponds to a different watershed or project.



Graphs Worksheet



Urban BMP Tool



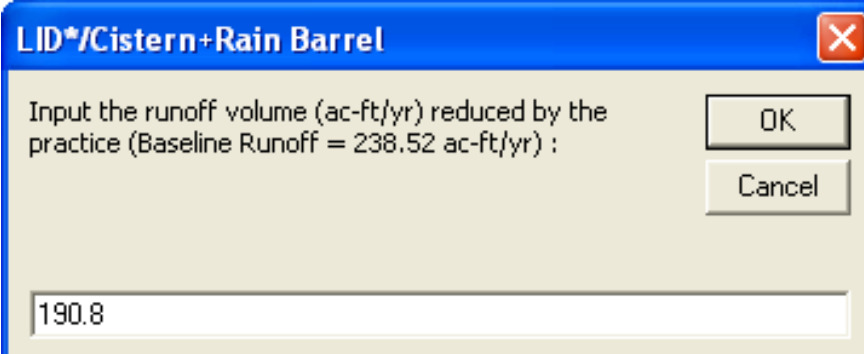
Urban Land Use Distribution

- STEPL automatically applies a default Urban Land Use distribution to identify the % commercial, %industrial, etc. (Table 8 on Input sheet)
- Modify these values with local data when using STEPL to model results of urban BMPs



LID* BMPs

- For LID BMPs marked with an asterisk (*), need to know the Runoff Volume (ac-ft/yr) reduced by the practice
 - LID*/Cistern
 - LID*/Cistern+Rain Barrel
 - LID*/Rain Barrel
- STEPL calculates the baseline runoff
 - If percentage runoff volume reduction is known, can apply this to determine runoff volume reduction amount
 - Load reduction efficiency = % runoff volume reduced



LID*/Cistern+Rain Barrel

Input the runoff volume (ac-ft/yr) reduced by the practice (Baseline Runoff = 238.52 ac-ft/yr) :

190.8

OK

Cancel

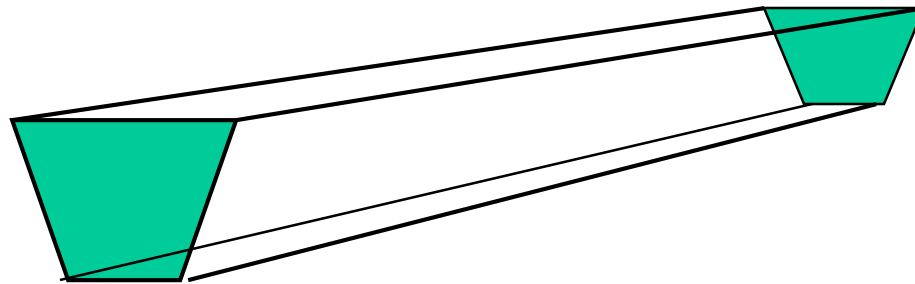


Gullies and Streambanks



Gully Stabilization

- Load
 - Average annual erosion during the life of the gully (ton/yr)
= Volume x Soil Weight / Years
 - Nutrient load
= Annual Erosion x Soil Nutrient Conc. x Correction Factor
- Load Reduction after implementing gully stabilization
 - Specify reduction efficiency (100% efficiency by default)
 - Reduction is equal to annual erosion x user-specified efficiency



$$\text{Volume} = (\text{Top Width} + \text{Bottom Width}) / 2 \times \text{Depth} \times \text{Length}$$



Gully Stabilization, cont.

- Nutrient Correction Factor
 - Smaller soil particles -> larger aggregated surface area -> more nutrients attached

Soil Texture	Nutrient Correction Factor
Clay	1.15
Silt	1.00
Sand	0.85
Peat	1.50



Streambank Erosion

- Load (Channel Erosion)
= Length * Height * Lateral Recession rate * Soil weight
- Load Reduction
= Load * Load reduction efficiency

Determining Lateral Recession Rate by Field Observation

Lateral Recession Rate (ft/yr)	Category	Description
0.01 – 0.05	Slight	Some bare bank, no exposed roots
0.06 – 0.2	Moderate	Bank is mostly bare
0.3 – 0.5	Severe	Bank is bare with exposed roots
0.5+	Very Severe	Bank is bare with fallen trees

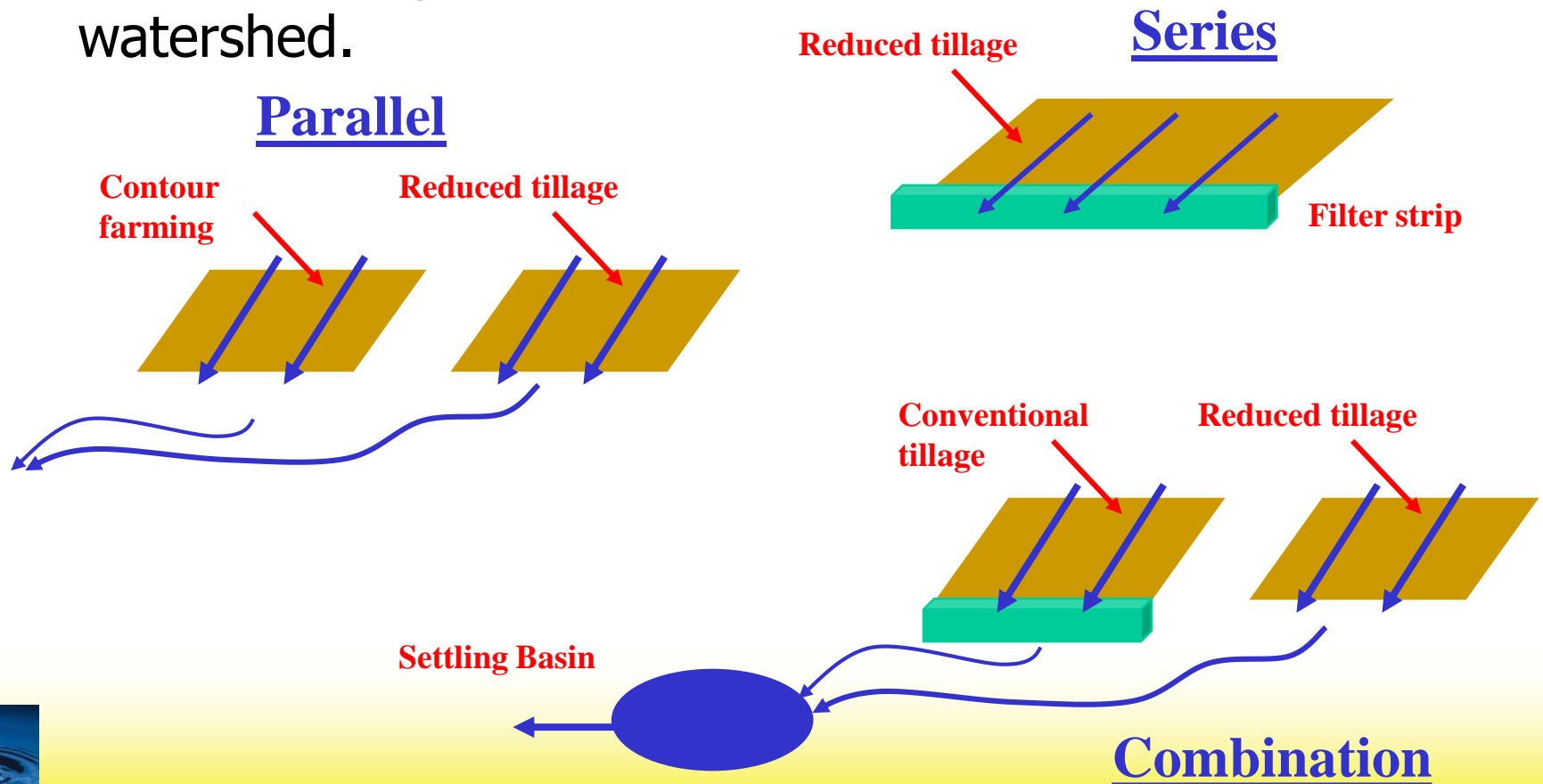


Use the BMP Calculator for Multiple BMPs



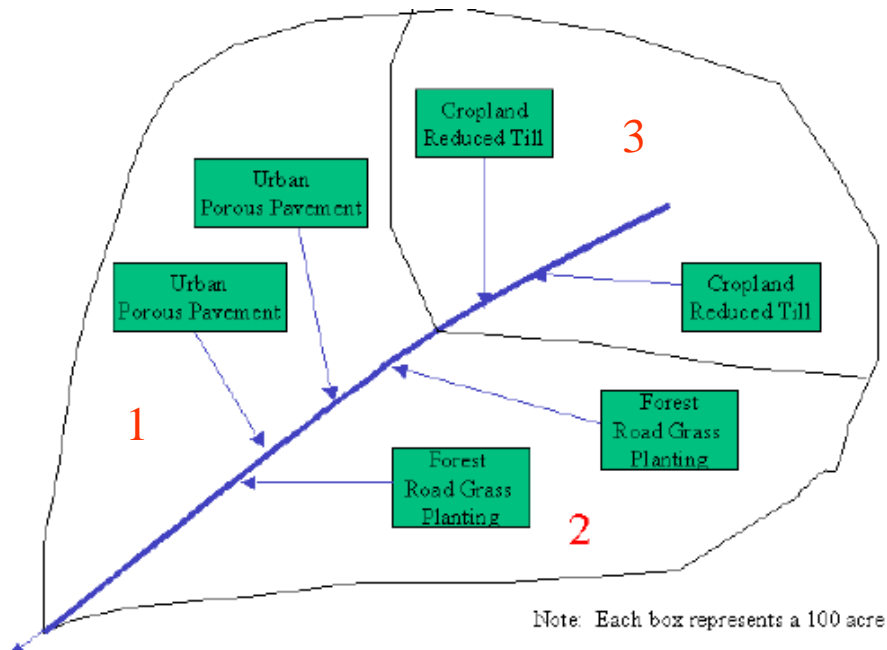
STEPL BMP Calculator

- Calculates combined efficiency of multiple BMPs for a given land use. The use of BMP calculator requires the understanding of BMPs and their placement in the watershed.

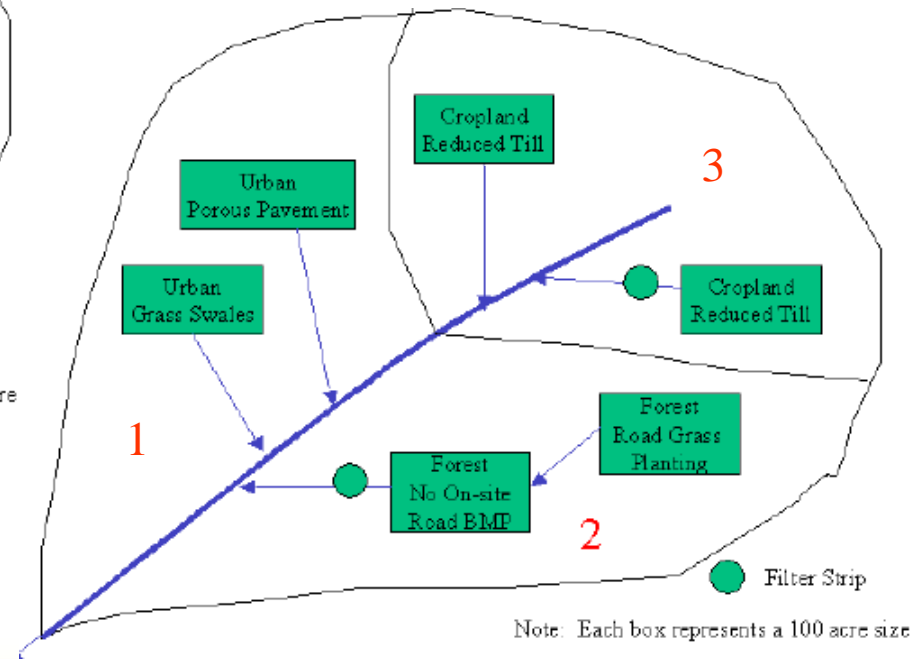


Need for BMP Calculator

- When is BMP Calculator needed?



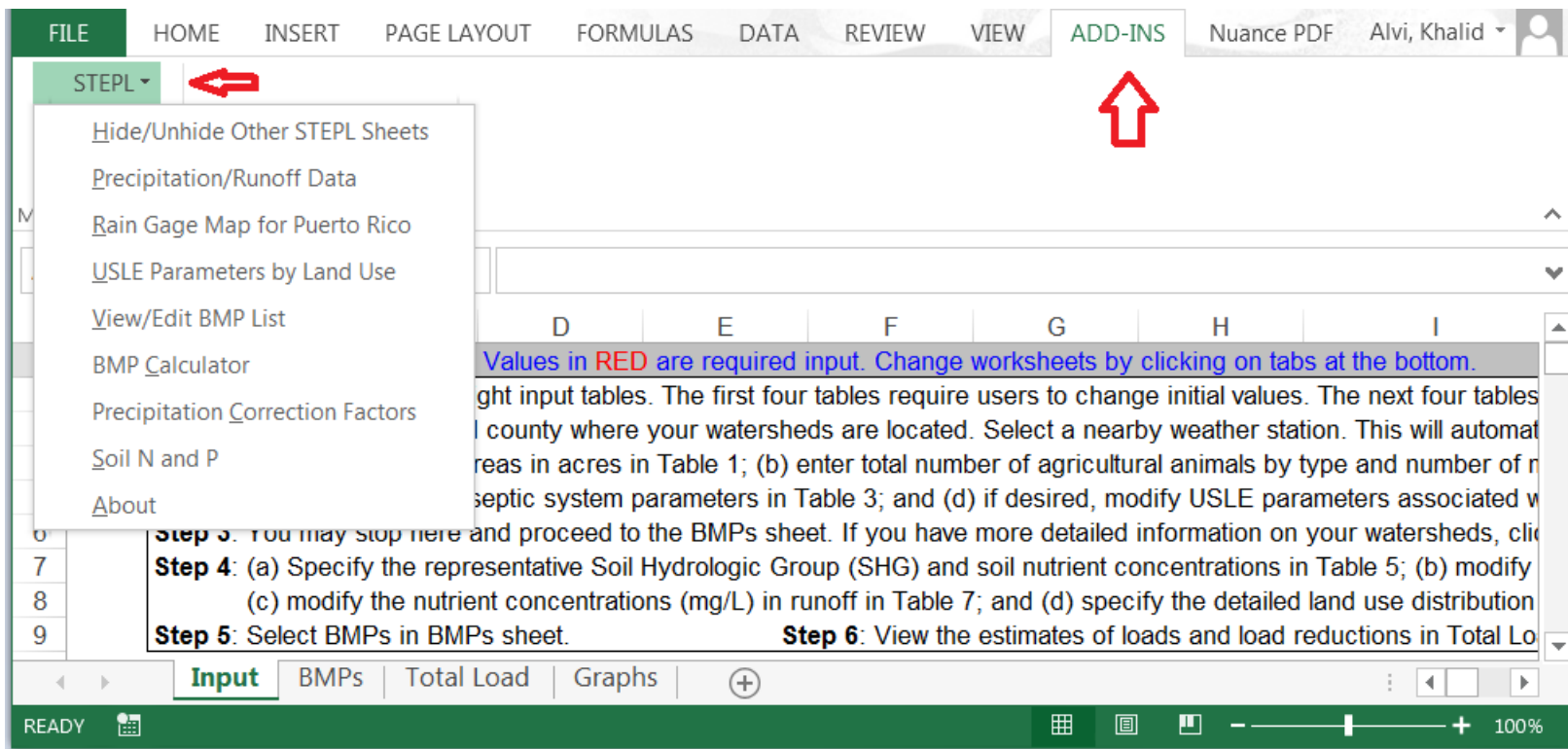
Not needed -► No combined efficiency calculation



Needed -► Each land use type uses more than one type of BMP



Customized Menu



Tip: To ensure that files are linked to the customized menu, set Excel **Default file location** to C\STEPL

Step: In Excel 2013, click on File menu > Options > Save



Default File Location

The image shows a Microsoft Excel window titled "Sample.xlsm - Microsoft Excel". The ribbon includes tabs for File, Home, Insert, Page Layout, Formulas, Data, Review, View, Developer, and Add-Ins. The File menu is open, showing options like Save, Save As, Open, Close, Info, Recent, New, Print, Save & Send, Help, Options, and Exit. The Excel Options dialog is open, with the Save category selected. The "Save workbooks" section is visible, showing settings for file format, AutoRecover, and default file location. The default file location is set to "C:\STEPL\". The OK button is highlighted.

1. File menu

2. Options

3. Save

4. Default file location: C:\STEPL\

5. OK

STEPL BMP Calculator

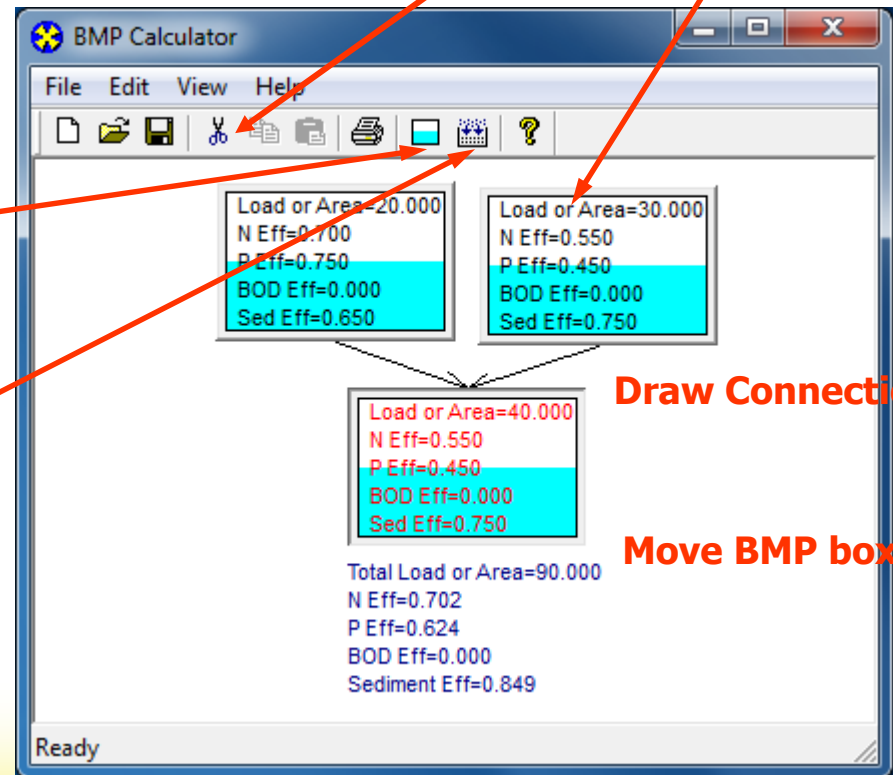
- Describe schematically BMP configuration
 - Number and linkages
 - BMP type and efficiency
 - Land use area
- Calculate combined efficiency

Add BMP box

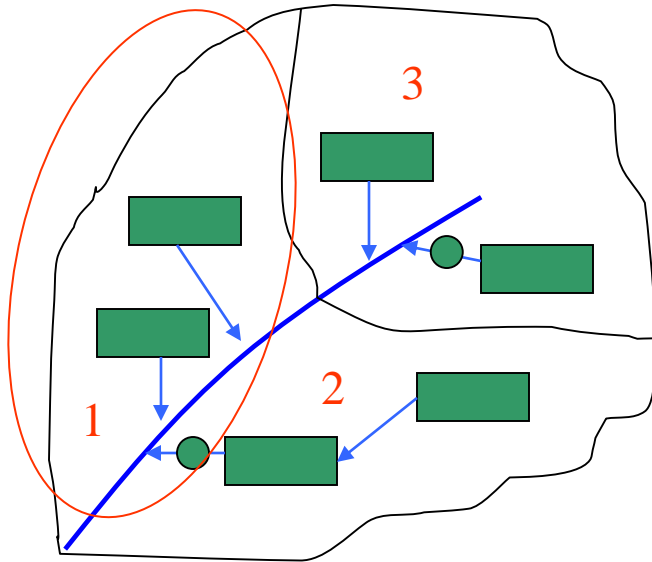
Calculate combined efficiency

Delete Connection

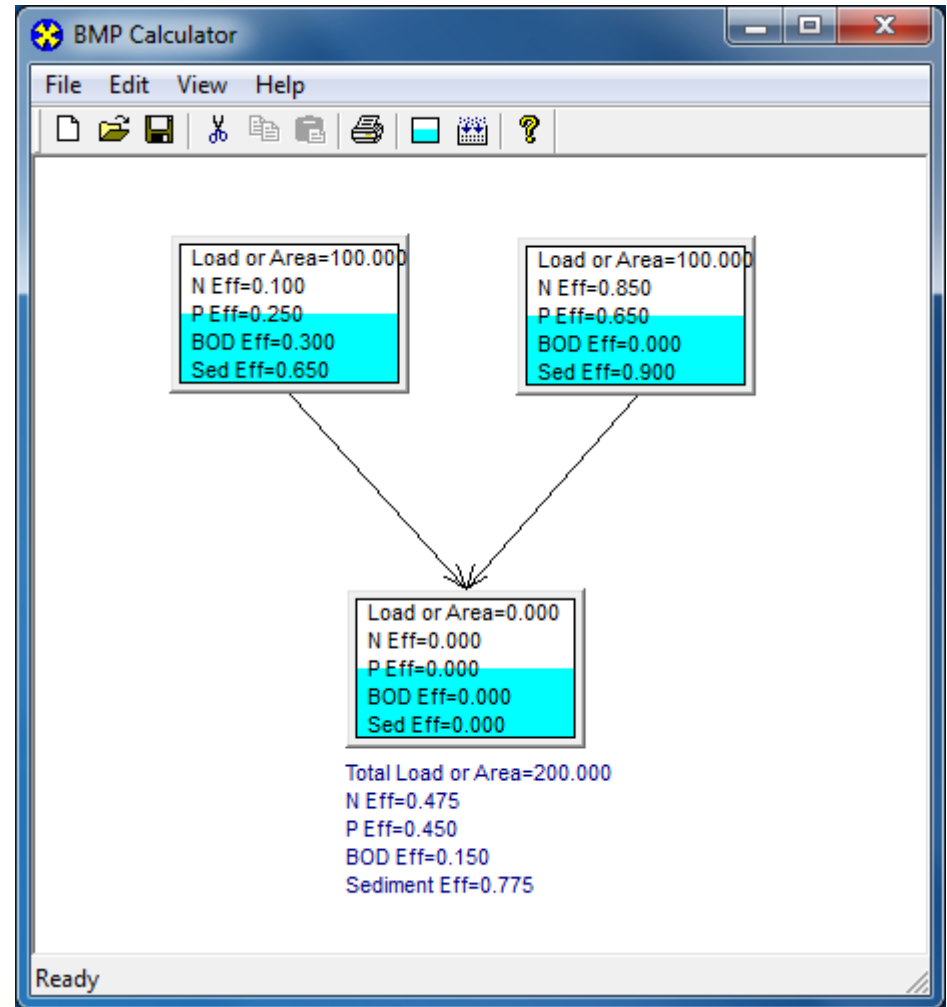
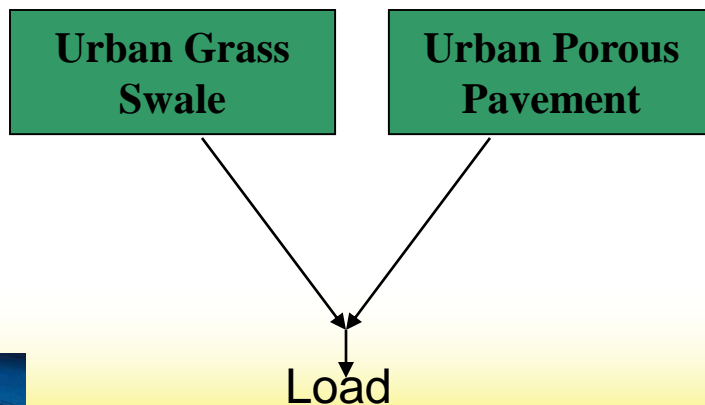
Use source area or original load as the weighting factor



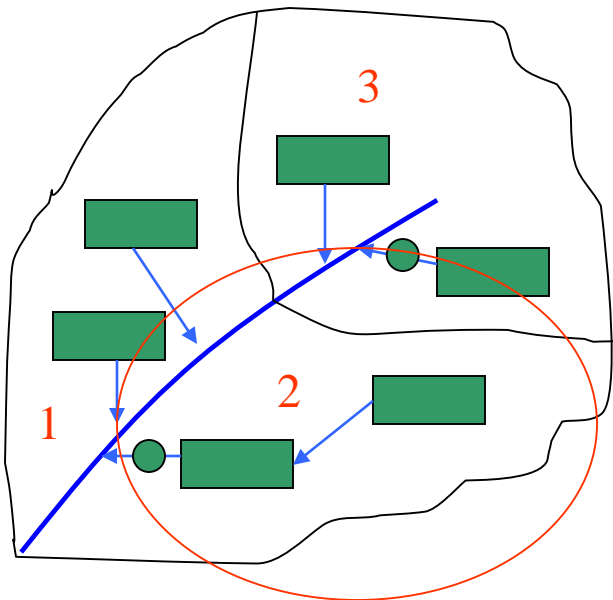
BMP Calculator – Example 1



Each box represents 100 ac



BMP Calculator – Example 2



Each box represents 100 ac

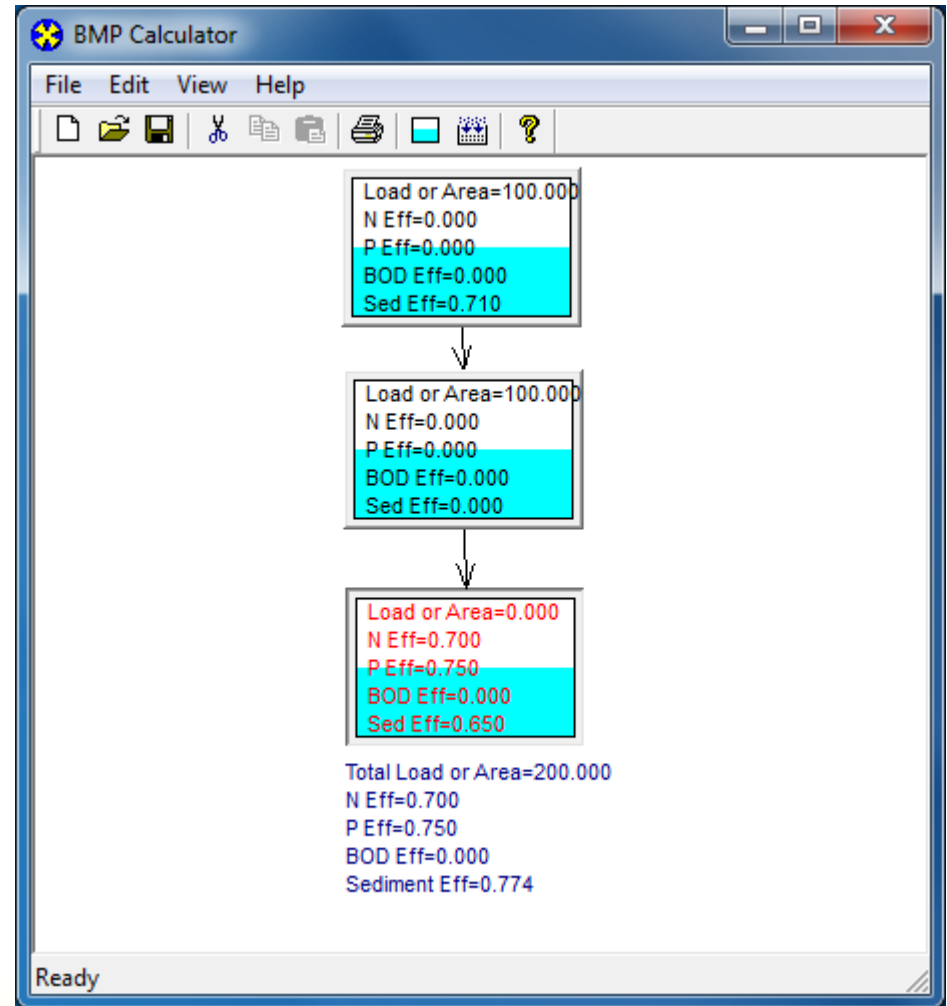
**Forest Road
Grass Planting**

**Forest No On-
site Road BMP**

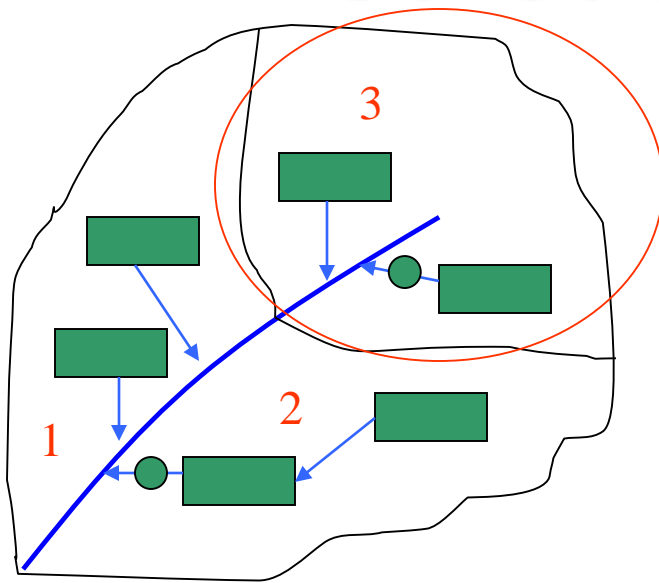


Filter Strip

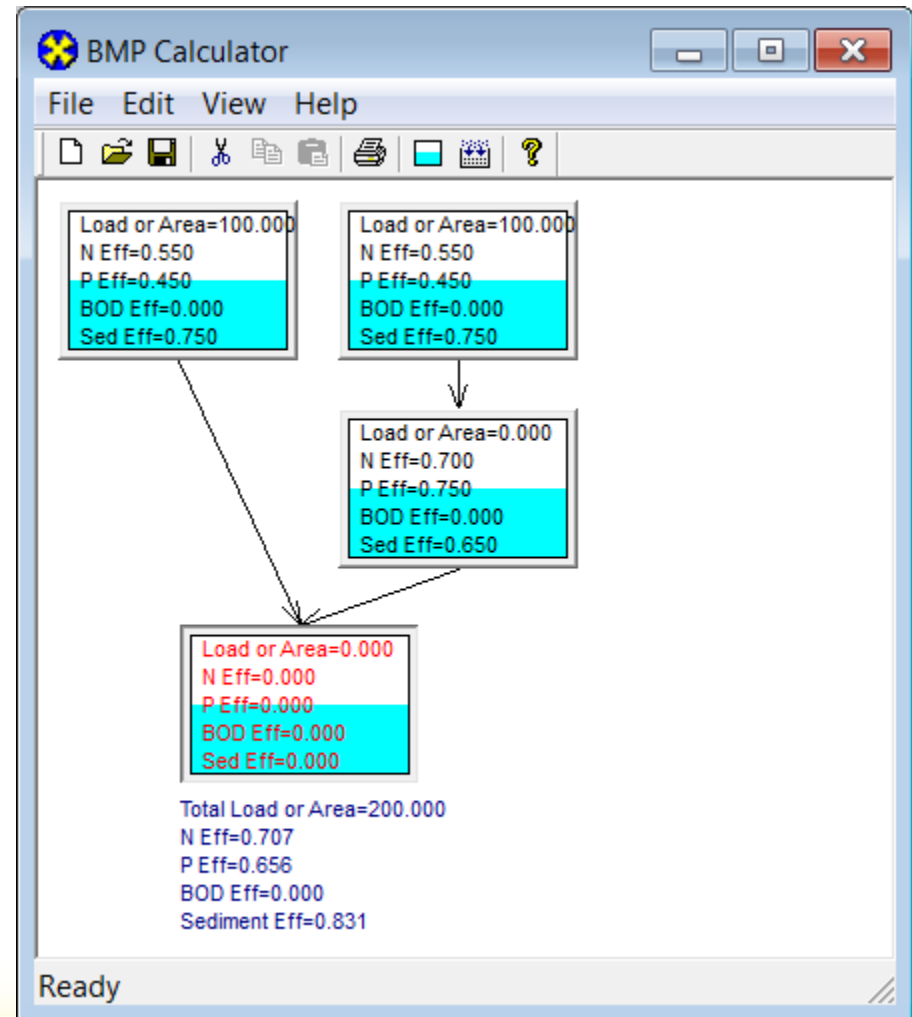
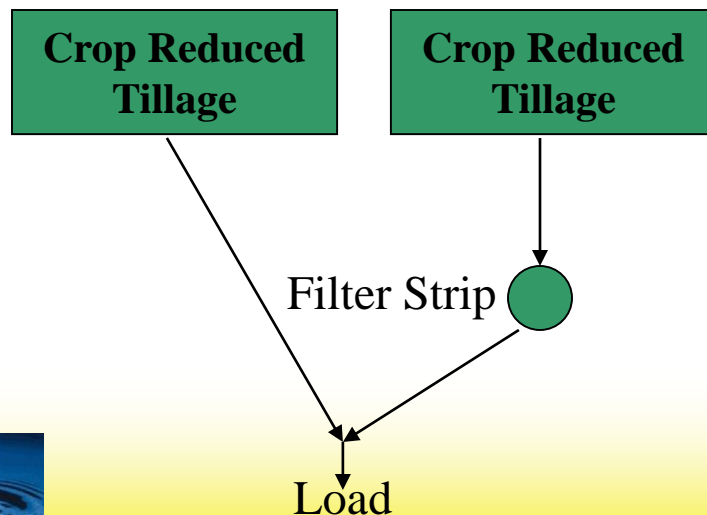
Load



BMP Calculator – Example 3



Each box represents 100 ac



Ability to add BMPs

- In STEPL customized menu, click “View/Edit BMP List”
- BMPList worksheet is shown, add or delete BMPs

<u>H</u> ide/Unhide Other STEPL Sheets
<u>P</u> recipitation/Runoff Data
<u>R</u> ain Gage Map for Puerto Rico
<u>U</u> SLE Parameters by Land Use
<u>V</u> iew/Edit BMP List
BMP <u>C</u> alculator
Precipitation <u>C</u> orrection Factors
<u>S</u> oil N and P
<u>A</u> bout

Customized menu

Landuse	BMP & Eff	N	P	BOD	Sediment
Cropland					
Cropland	0 No BMP	0	0	0	0
Cropland	Combined	0	0	0	0
Cropland	Contour Fe	0.485	0.55	ND	0.405
Cropland	Diversion	0.1	0.3	ND	0.35
Cropland	Filter strip	0.7	0.75	ND	0.65
Cropland	Reduced T	0.55	0.45	ND	0.75
Cropland	Streambar	0.75	0.75	ND	0.75
Cropland	Terrace	0.2	0.7	ND	0.85
Pastureland					
Pastureland	0 No BMP	0	0	0	0
Pastureland	Combined	0	0	0	0
Pastureland	User Defin	0.5	0.5	0.5	0.75

Example: New data inserted here



STEPL: Add New Data to BMP List

A	B	C	D	E	F	G	H	I	J	K
Landuse	BMP & Efficiency	N	P	BOD	Sediment					
Cropland						<Don't Delete	Instruction: 1. Do not delete the greyed rows. 2. BMP efficiencies should be <=1. 3. If you add a row for a new BMP, you must specify landuse, BMP name, and pollutant removal efficiencies. 4. Type "ND" for no data. 5. Click "Update BMP Data" to update selection boxes on the BMPs sheet. 6. Click "Save Updates" to save the BMP list to external text files in the STEPL/support folder.			
Cropland	0 No BMP	0	0	0	0	<Don't Delete				
Cropland	Combined BMPs-Calculated	0	0	0	0					
Cropland	Contour Farming	0.485	0.55	ND	0.405					
Cropland	Diversion	0.1	0.3	ND	0.35					
Cropland	Filter strip	0.7	0.75	ND	0.65					
Cropland	Reduced Tillage Systems	0.55	0.45	ND	0.75					
Cropland	Streambank stabilization and fencing	0.75	0.75	ND	0.75					
Cropland	Terrace	0.2	0.7	ND	0.85					
Pastureland						<Don't Delete				
Pastureland	0 No BMP	0	0	0	0	<Don't Delete				
Pastureland	Combined BMPs-Calculated	0	0	0	0					
Pastureland	User Defined	0.5	0.5	0.5	0.75					
Forest						<Don't Delete	Update BMP Data			
Forest	0 No BMP	0	0	0	0	<Don't Delete				

**Update BMP button
(BMPList worksheet)**

**New BMP added!
(BMPs worksheet)**

New BMP added!

2. BMPs and efficiencies for different pollutants on pastureland, ND=No Data					
Watershed	Pastureland				
	N	P	BOD	Sediment	BMPs
W1	0.5	0.5	0.5	0.75	<input checked="" type="radio"/> User Defined

Click **"Update BMP Data"** button to update the BMP selections in the BMPs worksheet



Update BMP List

1	Landuse	BMP & Efficiency	N	P	BOD	Sediment
2	Cropland					
3	Cropland	0 No BMP	0	0	0	0
4	Cropland	Combined BMPs-Calculated	0	0	0	0
5	Cropland	Contour Farming	0.485	0.55	ND	0.405
6	Cropland	Cover Crops	0.3	0.25	ND	0.25
7	Cropland	Diversion	0.1	0.3	ND	0.35
8	Cropland	Filter strip	0.7	0.75	ND	0.65
9	Cropland	Reduced Tillage Systems	0.55	0.45	ND	0.75
10	Cropland	Streambank stabilization and fencing	0.75	0.75	ND	0.75
11	Cropland	Terrace	0.2			
12	Pastureland					
13	Pastureland	0 No BMP	0			
14	Pastureland	Combined BMPs-Calculated	0			
15	Forest					
16	Forest	0 No BMP	0			
17	Forest	Combined BMPs-Calculated	0		0	0
18	Forest	Road dry seeding	ND	ND	ND	0.41
19	Forest	Road grass and legume seeding	ND	ND	ND	0.71
20	Forest	Road hydro mulch	ND	ND	ND	0.41
21	Forest	Road straw mulch	ND	ND	ND	0.41
22	Forest	Road tree planting	ND	ND	ND	0.5
23	Forest	Site preparation/hydro mulch/seed/fertilizer	ND	ND	ND	0.71
24	Forest	Site preparation/hydro mulch/seed/fertilizer	ND	ND	ND	0.69

Instruction:

1. Do not delete the greyed rows.
2. BMP efficiencies should be ≤ 1 .
3. If you add a row for a new BMP, you must specify landuse, BMP name, and pollutant removal efficiencies.
4. Type "ND" for no data.
5. Click "Update BMP Data" to update selection boxes on the BMPs sheet.
6. Click "Save Updates" to save the text files in the folder.

Microsoft Excel

Your changes to BMP data were saved to files in STEPL\Support folder!

OK

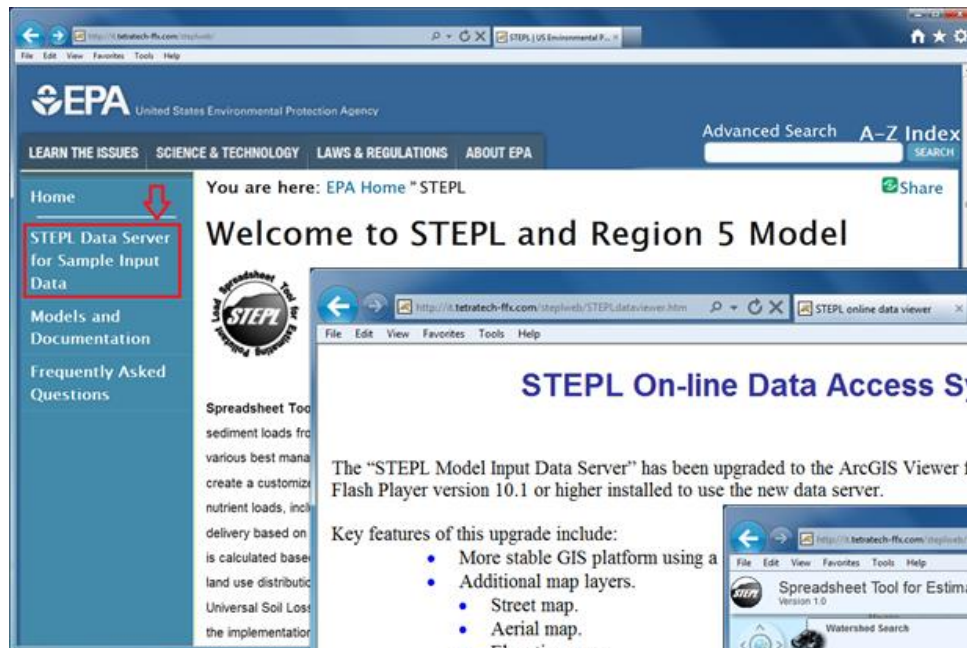
Save Updates

- Click **"Save Updates"** to save changes to the BMP List (will be available to any STEPL project). You can also modify these spreadsheets manually.
 - C:\Stepl\Support\AllBMPstepl.csv
 - C:\Stepl\Support\AllBMPs.csv

STEPL Model Input Data Server



STEPL Model Input Data Server



EPA United States Environmental Protection Agency

Learn the Issues | Science & Technology | Laws & Regulations | About EPA

Home

STEPL Data Server for Sample Input Data

Models and Documentation

Frequently Asked Questions

You are here: EPA Home » STEPL

Welcome to STEPL and Region 5 Model

Spreadsheet Tool for Estimating Pollutant Load Model Input Data Server

The "STEPL Model Input Data Server" has been upgraded to the ArcGIS Viewer for Flex 2.1. You must have Adobe Flash Player version 10.1 or higher installed to use the new data server.

Key features of this upgrade include:

- More stable GIS platform using a
- Additional map layers.
 - Street map.
 - Aerial map.
 - Elevation map.
 - Boundaries and places.
 - State and County boundaries.
 - Watershed boundary dataset
 - NHDplus catchments.
 - NHDplus flowlines and water
- Updated datasets.
 - Hydrologic Soil Group at the
 - Landuse area distribution at the
 - County-level Agricultural An

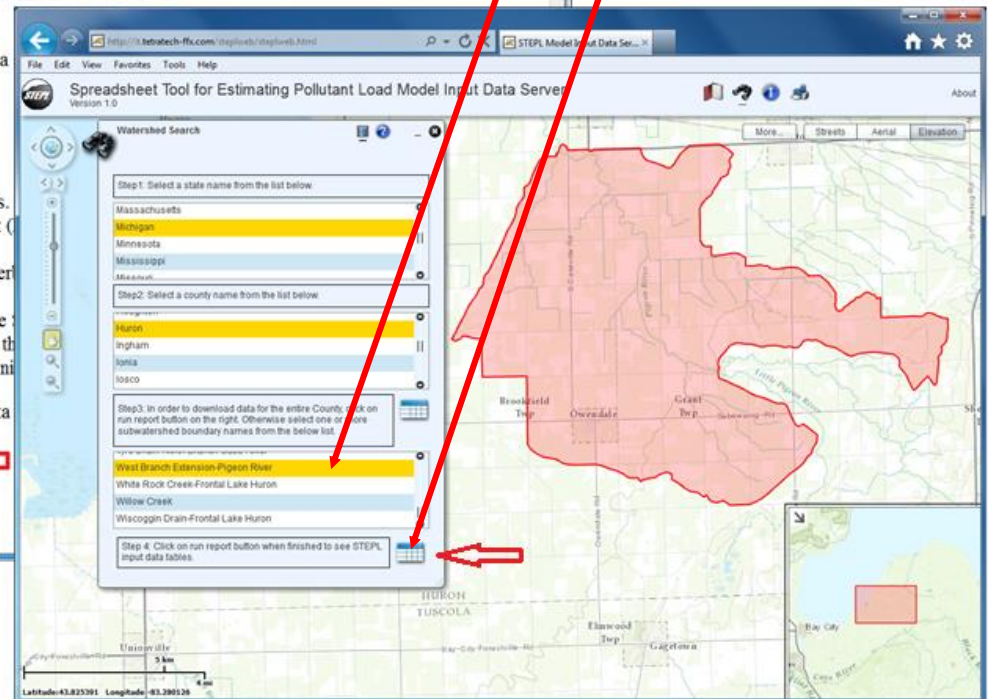
Click the link below to access the new online data

STEPL Model Input Data Server

Last revised: 12/08/2013

Data is available at
HUC 12 watershed

Generate data
summaries



STEPL On-line Data Access System

Spreadsheet Tool for Estimating Pollutant Load Model Input Data Server

Version 1.0

Watershed Search

Step 1: Select a state name from the list below

Massachusetts
Michigan
Minnesota
Mississippi
Montana

Step 2: Select a county name from the list below

Huron
Ingham
Ionia
Isaac

Step 3: In order to download data for the entire County, click on run report button on the right. Otherwise select one or more subwatershed boundary names from the below list

West Branch Extension-Pigeon River
White Rock Creek-Frontal Lake Huron
Willow Creek
Wiscoggin Drain-Frontal Lake Huron

Step 4: Click on run report button when finished to see STEPL input data tables.

Map showing Watershed boundary dataset (HUC 12 watershed) highlighted in red.

STEPL Model Input Data Server: Basic Report

Data is summarized by HUC12 watershed

Browser address bar: <http://it.tetrattech-ffx.com/steplweb/steplweb.html>

STEPL Model Input Data Ser...

File Edit View Favorites Tools Help

STEPL Spreadsheet Tool for Estimating Pollutant Load Model Input Data Server
Version 1.0

STEPL Input Data Report

Watershed **Landuse Area** Agricultural Animals Count Septic System Hydrologic Soil Group

Watershed Name	HUC12	Urban	Cropland	Pastureland	Forest	User Defined	Feedlots	Water	Others
West Branch Extension-Pigeon	040801030203	1616.582	22635.702	1742.012	1402.861	0.000	1.074	22.239	1179.800

Watershed Landuse Area **Agricultural Animals Count** Septic System Hydrologic Soil Group

Watershed Name	HUC12	Beef Cattle	Dairy Cattle	Swine	Sheep	Horse	Chicken	Turkey	Duck
West Branch Extension-Pigeon	040801030203	36	742	1005	41	17	0	3	6

Watershed Landuse Area Agricultural Animals Count **Septic System** Hydrologic Soil Group

Watershed Name	HUC12	Septic Systems	Population per Septic System	% Septic Failure Rate
West Branch Extension-Pigeon River	040801030203	725	2	1.14

Watershed Landuse Area Agricultural Animals Count Septic System **Hydrologic Soil Group**

Watershed Name	HUC12	Hydrologic Soil Group
West Branch Extension-Pigeon River	040801030203	C

Summary

- STEPL is a simple model for estimating long term average pollutant load reductions to support watershed planning
- STEPL is flexible but requires your input and judgment to apply it to your project
- Seek assistance from your colleagues
- Questions & suggestions for improvement are always welcome



STEPL Updates



BMPs Available (Version 4.3)

- Cropland
 - Combined BMPs-Calculated
 - Contour Farming
 - Diversion
 - Filter strip
 - Reduced Tillage Systems
 - Streambank stabilization and fencing
 - Terrace
- Pastureland
 - Combined BMPs-Calculated
 - User Defined



BMPs Available - Cont

- Feedlots
 - Diversion
 - Filter strip
 - Runoff Mgmt System
 - Solids Separation Basin
 - Solids Separation Basin w/Infilt Bed
 - Terrace
 - Waste Mgmt System
 - Waste Storage Facility



BMPs Available - Cont

- Forest

- Combined BMPs-Calculated
- Road dry seeding
- Road grass and legume seeding
- Road grass and legume seeding-New
- Road hydro mulch
- Road straw mulch
- Road tree planting
- Site preparation/hydro mulch/seed/fertilizer
- Site preparation/hydro mulch/seed/fertilizer/transplants
- Site preparation/steep slope seeder/transplant
- Site preparation/straw/crimp seed/fertilizer/transplant
- Site preparation/straw/crimp/net
- Site preparation/straw/net/seed/fertilizer/transplant
- Site preparation/straw/polymer/seed/fertilizer/transplant



BMPs Available - Cont

• Urban

- Alum Treatment
- Bioretention facility
- Combined BMPs-Calculated
- Concrete Grid Pavement
- Dry Detention
- Extended Wet Detention
- Filter Strip-Agricultural
- Grass Swales
- Infiltration Basin
- Infiltration Devices
- Infiltration Trench
- LID*/Cistern
- LID*/Cistern+Rain Barrel
- LID*/Rain Barrel
- LID/Bioretention
- LID/Dry Well
- LID/Filter/Buffer Strip
- LID/Infiltration Swale
- LID/Infiltration Trench
- LID/Vegetated Swale
- LID/Wet Swale
- Oil/Grit Separator
- Porous Pavement
- Sand Filter/Infiltration Basin
- Sand Filters
- Settling Basin
- Vegetated Filter Strips
- Weekly Street Sweeping
- Wet Pond
- Wetland Detention
- WQ Inlet w/Sand Filter
- WQ Inlets



Coming soon: **STEPL (version 4.4)***

- Additional BMPs
 - Cropland
 - Pasture land
 - Urban
 - Septic System
- Ecoli load reductions
- Flow volume reductions
- Improved guidance and reporting tools



New BMPs*

- Cropland

- Nutrient Management
- Conservation Cover
- Cropland Protection (crop rotation, cover crops)
- Cover Crops
- Critical Area Planting
- Field Border
- Riparian Buffer
- Water and Sediment Control Basin
- Wetland Creation/Restoration
- Drainage water management
- Land retirement/conversion (Cropland to Forest/Wetland/Grass)



New BMPs*

- Pasture

- Alternative Water Supply
- Streambank stabilization and fencing
- Streambank protection w/o fencing
- Livestock Exclusion Fencing
- Grazing Land Management (rotational grazing with fenced areas)
- Pasture and Hayland Planting (also called Forage Planting)
- Prescribed Grazing
- Tree/Shrub Establishment
- Critical Area Planting
- Heavy Use Area Protection
- Use Exclusion



New BMPs*

- Urban

- Green Roof
- Land retirement/conversion (Cropland to Forest/Wetland/Grass)
- Riparian buffer
- Wetland Restoration

- Septic Systems

- Septic repair/replacement
- Connect to sewer



Questions?

