

User Interface and File Management Improvements to the Colorado Urban Hydrograph Procedure (CUHP)

Derek Rapp - Peak Stormwater Engineering



**PEAK STORMWATER
ENGINEERING, LLC**



Overview of CUHP Update

- Created a standalone Excel spreadsheet that does not require separate code files for the math engine
- Simplified the user interface by removing unnecessary worksheets and consolidating user-input cells
- Updated the rainfall depth-area reduction factors (DARFs) and effective imperviousness calculations to be consistent with recent USDCM updates
- Added tools to allow the user to change input units and to run reasonableness checks on these inputs
- Added a check to compare SWMM target nodes for consistency with the actual SWMM input file
- Ability to create a single input file and then run several CUHP & SWMM scenarios to generate multiple output files



Intro Sheet

Colorado Urban Hydrograph Procedure	
Version 1.4.2 - Release Date: 10/16/2013	
Urban Drainage and Flood Control District Denver, Colorado email:udfcd@udfcd.org	
Purpose:	This program produces hydrographs using the Colorado Unit Hydrograph Procedure (CUHP)
Functions:	
Edit Raingages	Add/Remove Raingages and change names
Edit Subcatchments	Edit subcatchment parameters
Edit Multiple Run Options	Edit the Multiple Run options (Advanced User Features)
Import CUHP 2005 File	Import an older CUHP 2005 workbook into this updated version of CUHP
Check Subcatchments	Check whether subcatchment inputs conform to UDFCD guidelines
Check S'WMM Nodes	Check whether all subcatchment target nodes are included in the S'WMM .inp file
Run CUHP	Calculate effective precipitation and generate hydrographs for each subcatchment
Settings:	<p>Fill in the blue cells to begin:</p> <p>Project Title: CASFM Lunch Presentation</p> <p>Project Comment:</p> <p>Time Step Between Computations: 5 Minute(s); typically 5 or 1 (peak flow rate will differ slightly).</p> <p><input checked="" type="checkbox"/> Use Relative Path Names</p> <p>Output Workbook Filename: .\CASFM_Creek_Out.xlsx</p> <p>CUHP/S'WMM Interface Filename (Optional): .\CASFM_Creek_Interface.txt</p> <p>EPA S'WMM 5 Input Filename (Optional): .\CASFM_Creek.inp</p> <p>EPA S'WMM 5 Application File (Optional): C:\Program Files (x86)\EPA S'WMM 5.0\swmm5.exe</p> <p>S'WMM Hydrograph Start Time (Optional): 1/1/2005 12:00 AM</p>
Acknowledgements:	Thanks to Ben Urbonas, P.E., D.WRE and James C.Y.Guo, PhD, P.E., for the development of the CUHP project.
<p>Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver</p>	



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Check SWMM Nodes	Check whether all subcatchment target nodes are included in the SWMM .inp file
Run CUHP	Calculate effective precipitation and generate hydrographs for each subcatchment
Settings:	Fill in the blue cells to begin:
	Project Title: CASFM Lunch Presentation
	Project Comment:
	Time Step Between Computations: 5 Minute(s); typically 5 or 1 (peak flow rate will differ slightly).
	<input checked="" type="checkbox"/> Use Relative Path Names
	Output Workbook Filename: .\CASFM_Creek_Out.xlsx
	CUHP/SWMM Interface Filename (Optional): .\CASFM_Creek_Interface.txt
	EPA SWMM 5 Input Filename (Optional): .\CASFM_Creek.inp
	EPA SWMM 5 Application File (Optional): C:\Program Files (x86)\EPA SWMM 5.0\swmm5.exe
	SWMM Hydrograph Start Time (Optional): 1/1/2005 12:00 AM
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Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver

Time Step and File Settings have been moved to the Intro Sheet



Intro Sheet

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Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver	

Shortcuts to other worksheets

- Raingages
- Subcatchments
- Multiple Runs



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New tool added
to check
Subcatchment
input parameters
for
reasonableness



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Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver

New tool to check that user-entered SWMM nodes are consistent with node names in SWMM input file (.inp)



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Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver

To run EPA SWMM 5.0 from the CUHP interface, the user needs to provide the path to the SWMM Application file (.exe)



CUHP RAINGAGE MANAGEMENT

Use this worksheet to create raingages by temporal distribution or by user-defined hyetograph.

Raingage is a design storm by temporal distribution of one-hour rain depth with area correction factor

Add

Design Storm (Hyetograph) Name and Worksheet Location	
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Raingage Name	Raingage Worksheet
DIA	distarea://DIA
Sedalia	distarea://Sedalia
Denver	distarea://Denver

Minor changes to the worksheet layout were made



Raingages Sheet

CUHP RAINGAGE MANAGEMENT	
Use this worksheet to create raingages by temporal distribution or by user-defined hyetograph.	
Raingage is a design storm by temporal distribution of one-hour rain depth with area correction factor <input type="button" value="Add"/>	
Design Storm (Hyetograph) Name and Worksheet Location	
Raingage Name	Raingage Worksheet
DIA	distarea://DIA
Sedalia	distarea://Sedalia
Denver	distarea://Denver

Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver

Minor changes to the worksheet layout were made



Raingages Sheet

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Raingage is a design storm by temporal distribution of one-hour rain depth with area correction factor

Design Storm (Hyetograph) Name and Worksheet Location

Raingage Name	Raingage Worksheet
DIA	distarea://DIA
Sedalia	distarea://Sedalia
Denver	distarea://Denver

However, the underlying rainfall distributions and depth-area reduction factors (DARFs) were updated consistent with recent changes to the USDCM and the UD-Rain spreadsheet.



Subcatchments Sheet

CUHP SUBCATCHMENTS													
Click Here For Explanation Of Input Checks	<div>Columns with this color heading are for required user-input</div> <div>Columns with this color heading are for optional override values</div> <div>Columns with this color heading are for program-calculated values</div>												
	Click Here for Recommended Value Tables												
Check Subcatchment Inputs	Check SWMM Nodes	Units are in miles and square miles (click to change)						Maximum Depression Storage (Watershed inches)		Horton's Infiltration Parameters			DCIA
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi ²)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)	Percent Imperviousness	Pervious	Impervious	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2
CC100	100	DIA	0.00625	0.056818182	0.1136364	0.025	10	0.35	0.1	4.5	0.0018	0.6	2
CC101	101	DIA	0.08125	0.473484848	0.4924242	0.03	40	0.35	0.1	4.5	0.0018	0.6	2
CC102	102	DIA	0.171875	0.151515152	0.3030303	0.0047	35	0.35	0.1	4.5	0.0018	0.6	0
CC103	103	DIA	0.0578125	0.047348485	0.4852273	0.044	80	0.35	0.1	4.5	0.0018	0.6	1
CC201	201	Denver	0.09375	0.4875	0.7575758	0.052	60	0.35	0.1	3	0.0018	0.5	1
CC202	202	Denver	0.0859375	0.319507576	0.5350379	0.007	15	0.35	0.1	3	0.0018	0.5	2
CC301	301	Denver	0.053125	0.083333333	0.4314394	0.087	2	0.35	0.1	3	0.0018	0.5	0
CC302	302	Denver	0.1671875	0.265151515	0.5443182	0.04	40	0.35	0.1	3	0.0018	0.5	1
CC303	303	Denver	6.21	2.272727273	4.0621212	0.04	2	0.35	0.1	3	0.0018	0.5	0
CC401	4001	Sedalia	0.09375	0.09469697	0.5089015	0.025	55	0.35	0.1	6	0.0007	1	1

Intro Raingages **Subcatchments** Multiple Runs DIA Sedalia Denver



Subcatchments Sheet

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Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi ²)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)	Percent Imperviousness	Pervious	Impervious	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2
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CC102	102	DIA	0.171875	0.151515152	0.3030303	0.0047	35	0.35	0.1	4.5	0.0018	0.6	0
CC103	103	DIA	0.0578125	0.047348485	0.4852273	0.044	80	0.35	0.1	4.5	0.0018	0.6	1
CC201	201	Denver	0.09375	0.4875	0.7575758	0.052	60	0.35	0.1	3	0.0018	0.5	1
CC202	202	Denver	0.0859375	0.319507576	0.5350379	0.007	15	0.35	0.1	3	0.0018	0.5	2
CC301	301	Denver	0.053125	0.083333333	0.4314394	0.087	2	0.35	0.1	3	0.0018	0.5	0
CC302	302	Denver	0.1671875	0.265151515	0.5443182	0.04	40	0.35	0.1	3	0.0018	0.5	1
CC303	303	Denver	6.21	2.272727273	4.0621212	0.04	2	0.35	0.1	3	0.0018	0.5	0
CC401	4001	Sedalia	0.09375	0.09469697	0.5089015	0.025	55	0.35	0.1	6	0.0007	1	1

The SWMM Node corresponding to the Subcatchment Name has been moved into this worksheet. The Print Mode option has been removed and all subcatchments now use the old Option 3.



Subcatchments Sheet

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	Click Here for Recommended Value Tables												
	Check Subcatchment Inputs	Check SWMM Nodes	Units are in miles and square miles (click to change)			Maximum Depression Storage (Watershed inches)				Horton's Infiltration Parameters			DCIA
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi ²)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)	Percent Imperviousness	Pervious	Impervious	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2
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CC401	401	Denver	0.1671875	0.265151515	0.5443182	0.04					0.0018	0.5	1
CC501	501	Denver	6.21	2.272727273	4.0621212	0.04					0.0018	0.5	0
CC601	601	Denver	0.09375	0.09469697	0.5089015	0.025					0.0007	1	1

Feet and Sq. Ft.

Units are in feet and square feet (click to change)			
Area (ft ²)	Length to Centroid (ft)	Length (ft)	
174240	300	600	
2265120	2500	2600	
4791600	800	1600	
1611720	250	2562	
2613600	2574	4000	
2395800	1687	2825	
1481040	440	2278	
4660920	1400	2874	
173124864	12000	21448	
2613600	500	2687	

Feet and Acres

Units are in feet and acres (click to change)			
Area (acre)	Length to Centroid (ft)	Length (ft)	
4	300	600	
52	2500	2600	
110	800	1600	
37	250	2562	
60	2574	4000	
55	1687	2825	
34	440	2278	
107	1400	2874	
3974.4	12000	21448	
60	500	2687	

User can change units for input length and area



Subcatchments Sheet

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	Check Subcatchment Inputs	Check SWMM Nodes	Units are in feet and acres (click to change)				Click Here for Recommended Value Tables		Maximum Depression Storage (Watershed inches)		Horton's Infiltration Parameters		DCIA
Subcatchment	EPA SWMM	Area	Length to	Length	Percent	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2				
AG	AH	AI	AJ	AK	AL	AM	AN						
Typical Depression Losses for Various Land Covers (All Values in Inches)						Recommended Horton's Equation Parameters							
Land Cover		Range in Depression (Retention) Losses		Recommended		NRCS Hydrologic Soil Group	Infiltration (inches per hour)		Decay Coefficient - a				
Impervious:							Initial - f_i		Final - f_o				
Large paved areas		0.05 - 0.15		0.1		A	5.0		1.0		0.0007		
Roofs-flat		0.1 - 0.3		0.1		B	4.5		0.6		0.0018		
Roofs-sloped		0.05 - 0.1		0.05		C	3.0		0.5		0.0018		
Pervious:						D	3.0		0.5		0.0018		
Lawn grass		0.2 - 0.5		0.35									
Wooded areas and open fields		0.2 - 0.6		0.4									

Recommended values are provided on this worksheet to save the user from having to check the USDCM



Subcatchments Sheet

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Subcatchment Name	EPA SWMM Target Node	Raingage	Area (acre)	Length to Centroid (ft)	Length (ft)	Slope (ft/ft)	Percent Imperviousness	Pervious	Impervious	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2
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CC201	201	Denver	60	2574	4000	0.052	60	0.35	0.1	3	0.0018	0.5	1
CC202	202	Denver	55	1687	2825	0.007	15	0.35	0.1	3	0.0018	0.5	2
CC301	301	Denver	34	440	2278	0.087	2	0.35	0.1	3	0.0018	0.5	0
CC302	302	Denver	107	1400	2874	0.04	40	0.35	0.1	3	0.0018	0.5	1
CC303	303	Denver	3974.4	12000	21448	0.04	2	0.35	0.1	3	0.0018	0.5	0
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Intro

Raingages

Subcatchments

Multiple Runs

DIA

Sedalia

Denver

User can check their inputs for reasonableness



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CC101	101	DIA	0.08125	0.473484848	0.4924242	0.03
CC102	102	DIA	0.171875	0.151515152	0.3030303	0.0047
CC103	103	DIA	0.0578125	0.047348485	0.4852273	0.044
CC201	201	Denver	0.09375	0.4875	0.7575758	0.052
CC202	202	Denver	0.0859375	0.319507576	0.5350379	0.007
CC301	301	Denver	0.053125	0.083333333	0.4314394	0.087
CC302	302	Denver	0.1671875	0.265151515	0.5443182	0.04
CC303	303	Denver	6.21	2.272727273	4.0621212	0.04
CC401	4001	Sedalia	0.09375	0.09469697	0.5089015	0.025

Error: Red and Yellow subcatchment checks

Error: There are RED input check errors. RED cells are unacceptable.

Warning: There are YELLOW input check errors. YELLOW cells are questionable.

Click to see explanation of subcatchment input checks

User can check their inputs for reasonableness



Subcatchments Sheet

CUHP SUBCATCHMENTS									
Click Here For Explanation Of Input Checks		Columns with this color heading are for required user-input Columns with this color heading are for optional override values Columns with this color heading are for program-calculated values							
Check Subcatchment Inputs	Check SWMM Nodes	Units are in miles and square miles (click to change)							
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi ²)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)			
CC100	100	DIA	0.00625	0.056818182	0.1136364	0.025			
CC101	101	DIA	0.08125	0.473484848	0.4924242	0.03			
CC102	102	DIA	0.171875	0.151515152	0.3030303	0.0047			
CC103	103	DIA	0.0578125	0.047348485	0.4852273	0.044			
CC201	201	Denver	0.09375	0.4875	0.7575758	0.052			
CC202	202	Denver	0.0859375	0.319507576	0.5350379	0.007			
CC301	301	Denver	0.053125	0.083333333	0.4314394	0.087			
CC302	302	Denver	0.1671875	0.265151515	0.5443182	0.04			
CC303	303	Denver	6.21	2.272727273	4.0621212	0.04			
CC401	4001	Sedalia	0.09375	0.09469697	0.5089015	0.025			

Explanation of Subcatchment Input Checks

Info | Centroid | Length | Slope | **Area**

Color in the "Area" column:

a = area

a ≤ 0	a > 0 and a < 5 (acre)	a ≥ 5 (acre) and a ≤ 5 (mi²)	a > 5 (mi²)
--------------	-------------------------------------	--	----------------------------------

Highlights: $A < 5$ acres & $A > 5$ sq.mi.
 In these ranges, special guidelines apply.



Subcatchments Sheet

CUHP SUBCATCHMENTS						
Click Here For Explanation Of Input Checks	Columns with this color heading are for required user-input					
	Columns with this color heading are for optional override values					
	Columns with this color heading are for program-calculated values					
Check Subcatchment Inputs	Check SWMM Nodes	Units are in miles and square miles (click to change)				
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi ²)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)
CC100	100	DIA	0.00625	0.056818182	0.1136364	0.025
CC101	101	DIA	0.08125	0.473484848	0.4924242	0.03
CC102	102	DIA	0.171875	0.151515152	0.3030303	0.0047
CC103	103	DIA	0.0578125	0.047348485	0.4852273	0.044
CC201	201	Denver	0.09375	0.4875	0.7575758	0.052
CC202	202	Denver	0.0859375	0.319507576	0.5350379	0.007
CC301	301	Denver	0.053125	0.083333333	0.4314394	0.087
CC302	302	Denver	0.1671875	0.265151515	0.5443182	0.04
CC303	303	Denver	6.21	2.272727273	4.0621212	0.04
CC401	4001	Sedalia	0.09375	0.09469697	0.5089015	0.025

Explanation of Subcatchment Input Checks

Info Centroid Length Slope Area

Color in the "Length to Centroid" column:

Length to Centroid

$$r = \frac{\text{Length to Centroid}}{\text{Length}}$$

$r < 0.1$	$r \geq 0.1$ and $r < 0.3$	$r \geq 0.3$ and $r \leq 0.9$	$r > 0.9$
-----------	----------------------------	-------------------------------	-----------

Acceptable Range is: $0.1 \leq \frac{L_{centroid}}{L} < 0.9$

Values less than 0.3 are questionable



Subcatchments Sheet

CUHP SUBCATCHMENTS						
Click Here For Explanation Of Input Checks	Columns with this color heading are for required user-input					
	Columns with this color heading are for optional override values					
	Columns with this color heading are for program-calculated values					
Check Subcatchment Inputs	Check SWMM Nodes	Units are in miles and square miles (click to change)				
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi ²)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)
CC100	100	DIA	0.00625	0.056818182	0.1136364	0.025
CC101	101	DIA	0.08125	0.473484847	0.4924242	0.03
CC102	102	DIA	0.171875	0.151515152	0.3030303	0.0047
CC103	103	DIA	0.0578125	0.047348485	0.4852273	0.044
CC201	201	Denver	0.09375	0.4875	0.7575758	0.052
CC202	202	Denver	0.0859375	0.319507576	0.5350379	0.007
CC301	301	Denver	0.053125	0.083333333	0.4314394	0.087
CC302	302	Denver	0.1671875	0.265151515	0.5443182	0.04
CC303	303	Denver	6.21	2.272727273	4.0621212	0.04
CC401	4001	Sedalia	0.09375	0.09469697	0.5089015	0.025

Explanation of Subcatchment Input Checks

Info | Centroid | **Length** | Slope | Area

Color in the "Length" column:

$$r = \frac{\text{Length}^2}{\text{Area}}$$

r < 1
r ≥ 1 and r ≤ 4
r > 4

Acceptable Range is: $\frac{L^2}{\text{Area}} \geq 1$;
 values greater than 4 are questionable



Subcatchments Sheet

CUHP SUBCATCHMENTS						
Click Here For Explanation Of Input Checks		Columns with this color heading are for required user-input				
		Columns with this color heading are for optional override values				
		Columns with this color heading are for program-calculated values				
Check Subcatchment Inputs	Check SWMM Nodes	Units are in miles and square miles (click to change)				
Subcatchment Name	EPA SWMM Target Node	Rainage	Area (mi ²)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)
CC100	100	DIA	0.00625	0.056818182	0.1136364	0.025
CC101	101	DIA	0.08125	0.473484848	0.4924242	0.03
CC102	102	DIA	0.171875	0.151515152	0.3030303	0.0047
CC103	103	DIA	0.0578125	0.047348485	0.4852273	0.044
CC201	201	Denver	0.09375	0.4875	0.7575758	0.052
CC202	202	Denver	0.0859375	0.319507576	0.5350379	0.007
CC301	301	Denver	0.053125	0.083333333	0.4314394	0.087
CC302	302	Denver	0.1671875	0.265151515	0.5443182	0.04
CC303	303	Denver	6.21	2.272727273	4.0621212	0.04
CC401	4001	Sedalia	0.09375	0.09469697	0.5089015	0.025

Explanation of Subcatchment Input Checks

Info

Centroid

Length

Slope

Area

Color in the "Slope" column:

s = slope

s ≤ 0

s > 0 and s < 0.005

s ≥ 0.005 and s ≤ 0.08

s > 0.08

Highlights: $S < 0.005$ & $S > 0.08$ ft/ft

In these ranges, results may not be accurate



Subcatchments Sheet

CUHP SUBCATCHMENTS

Click Here For Explanation Of Input Checks

Check Subcatchment Inputs

Check SWMM Nodes

Columns with this color heading are for required user-input
 Columns with this color heading are for optional override values
 Columns with this color heading are for program-calculated values

Units are in miles and seconds (click to change)

Warning: SWMM Nodes missing from .inp file

Click Here for

Maximum Depressure (Watershed)

Previous

Imper

Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi ²)	Length to Centroid (mi)							
CC100	100	DIA	0.00625	0.056818782							
CC101	101	DIA	0.08125	0.473484848	0.4924242	0.03	40	0.35	0		
CC102	102	DIA	0.171875	0.151515152	0.3030303	0.0047	35	0.35	0		
CC103	103	DIA	0.0578125	0.047348485	0.4852273	0.044	80	0.35	0		
CC201	201	Denver	0.09375	0.4875	0.7575758	0.052	60	0.35	0		
CC202	202	Denver	0.0859375	0.319507576	0.5350379	0.007	15	0.35	0		
CC301	301	Denver	0.053125	0.083333333	0.4314394	0.087	2	0.35	0		
CC302	302	Denver	0.1671875	0.265151515	0.5443182	0.04	40	0.35	0		
CC303	303	Denver	6.21	2.272727273	4.0621212	0.04	2	0.35	0		
CC401	4001	Sedalia	0.09375	0.09469697	0.5089015	0.025	55	0.35	0		

[JUNCTIONS]

Name	Invert Elev.
100	0
101	0
102	0
201	0
301	0
302	0
401	0

[OUTFALLS]

Name	Invert Elev.
202	0

[DIVIDERS]

Name	Invert Elev.
103	0

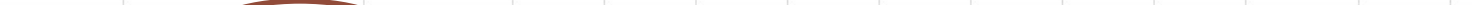
[STORAGE]

Name	Invert Elev.
303	0

Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver

When checking SWMM nodes for consistency, any nodes not found in the SWMM input file (.inp) will be highlighted





The screenshot shows the top navigation bar of the ArcGIS Desktop application. The tabs are labeled 'Intro', 'Raingages', 'Subcatchments', 'Multiple Runs', 'DII', 'Sedalia', and 'Denver'. The 'Multiple Runs' tab is currently selected and highlighted with a red circle.

Multiple Runs Sheet

RUN MULTIPLE CUHP AND SWMM SCENARIOS

Instructions on How To Use
Multiple Run Tool

Columns with this color heading are for required user-input

Columns with this color heading are for program-calculated values

Clear Worksheet

Fill Out Subcatchment
Names

Create List of Raingages
with Area Correction

Run Multiple CUHP Scenarios

Run Multiple SWMM Scenarios

SWMM Run
Wait Time
(sec)
5

(Optional) SWMM
Time Series Inflow
"Modification Type"
(LU, RP, or LU&RP)

Subcatchment Name	Existing Landuse % Imperviousness	Future Landuse % Imperviousness
CC100		
CC101		
CC102		
CC103		
CC201		
CC202		
CC301		
CC302		
CC303		
CC401		

Raingage	Return Period (Years)	1 Hr Depths (in)	6 Hr Depths (in)
----------	-----------------------------	------------------------	------------------------

Enter "X" to Run Scenario	Scenario ID	Land Use (E or F)	Return Period (yr)	Correction Area (Sq.Mi.)
---------------------------------	----------------	----------------------	--------------------------	--------------------------------

(Optional) SWMM
Time Series Inflow
Table "NAME"

Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver

Automatically copies all subcatchment names
from the Subcatchments sheet to this column



Multiple Runs Sheet

RUN MULTIPLE CUHP AND SWMM SCENARIOS

Instructions on How To Use
Multiple Run Tool

Columns with this color heading are for required user-input

Columns with this color heading are for program-calculated values

Clear Worksheet

Fill Out Subcatchment
Names

Create List of Raingages
with Area Correction

Run Multiple CUHP Scenarios

Run Multiple SWMM Scenarios

SWMM Run
Wait Time
(sec)
5

(Optional) SWMM
Time Series Inflow
"Modification Type"
(LU, RP, or LU&RP)

Subcatchment Name	Existing Landuse % Imperviousness	Future Landuse % Imperviousness
CC100		
CC101		
CC102		
CC103		
CC201		
CC202		
CC301		
CC302		
CC303		
CC401		

Raingage	Return Period (Years)	1 Hr Depths (in)	6 Hr Depths (in)
----------	-----------------------------	------------------------	------------------------

Enter "X" to Run Scenario	Scenario ID	Land Use (E or F)	Return Period (yr)	Correction Area (Sq.Mi.)
---------------------------------	----------------	----------------------	--------------------------	--------------------------------

(Optional) SWMM
Time Series Inflow
Table "NAME"

The user can then enter existing and
future percent imperviousness values

Imperviousness values from one of these
columns will be copied and pasted to the
subcatchments sheet for each scenario.



Multiple Runs Sheet

RUN MULTIPLE CUHP AND SWMM SCENARIOS

Instructions on How To Use
Multiple Run Tool

Columns with this color heading are for required user-input

Columns with this color heading are for program-calculated values

Clear Worksheet

Fill Out Subcatchment
Names

Create List of Raingages
with Area Correction

Run Multiple CUHP Scenarios

SWMM Run
Wait Time
(sec)
5

(Optional) SWMM
Time Series Inflow
"Modification Type"
(LU, RP, or LU&RP)

Run Multiple SWMM Scenarios

Subcatchment Name	Existing Landuse % Imperviousness	Future Landuse % Imperviousness
CC100	10	40
CC101	40	40
CC102	35	35
CC103	80	80
CC201	60	60
CC202	15	80
CC301	2	40
CC302	40	40
CC303	2	40
CC401	55	55

Raingage	Return Period (Years)	1 Hr Depths (in)	6 Hr Depths (in)
----------	-----------------------------	------------------------	------------------------

Enter "X" to Run Scenario	Scenario ID	Land Use (E or F)	Return Period (yr)	Correction Area (Sq.Mi.)
---------------------------------	----------------	----------------------	--------------------------	--------------------------------

(Optional) SWMM
Time Series Inflow
Table "NAME"

Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver

The next step is to create a table of the
available raingages with area correction



Multiple Runs Sheet

RUN MULTIPLE CUHP AND SWMM SCENARIOS

Instructions on How To Use
Multiple Run Tool

Columns with this color heading are for required user-input

Columns with this color heading are for program-calculated values

Clear Worksheet

Fill Out Subcatchment
Names

Create List of Raingages
with Area Correction

Run Multiple CUHP Scenarios

SWMM Run
Wait Time
(sec)
5

(Optional) SWMM
Time Series Inflow
"Modification Type"
(LU, RP, or LU&RP)

Run Multiple SWMM Scenarios

Enter "X" to Run Scenario	Scenario ID	Land Use (E or F)	Return Period (yr)	Correction Area (Sq.Mi.)
---------------------------------	----------------	----------------------	--------------------------	--------------------------------

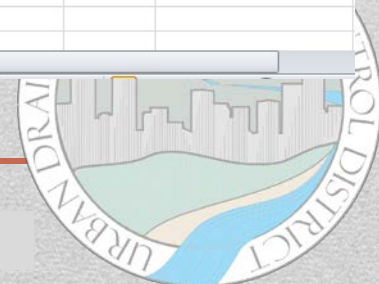
(Optional) SWMM
Time Series Inflow
Table "NAME"

Subcatchment Name	Existing Landuse % Imperviousness	Future Landuse % Imperviousness
CC100	10	40
CC101	40	40
CC102	35	35
CC103	80	80
CC201	60	60
CC202	15	80
CC301	2	40
CC302	40	40
CC303	2	40
CC401	55	55

Raingage	Return Period (Years)	1 Hr. Depths (in)	6 Hr Depths (in)
DIA	WQ	0.6	N/A
	2		
	5		
	10		
	25		
	50		
Sedalia	100		
	500		
	WQ	0.6	N/A
	2		
	5		
	10		
Denver	25		
	50		
	100		
	500		
	WQ	0.6	N/A
	2		

The user can then fill
out the table with the
appropriate depths from
UD-Rain or the NOAA
Atlas

Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver



Multiple Runs Sheet

RUN MULTIPLE CUHP AND SWMM SCENARIOS

Instructions on How To Use
Multiple Run Tool

Columns with this color heading are for required user-input

Columns with this color heading are for program-calculated values

Clear Worksheet

Fill Out Subcatchment
Names

Create List of Raingages
with Area Correction

Run Multiple CUHP Scenarios

Run Multiple SWMM Scenarios

SWMM Run
Wait Time
(sec)
5

(Optional) SWMM
Time Series Inflow
"Modification Type"
(LU, RP, or LU&RP)

Subcatchment Name	Existing Landuse % Imperviousness	Future Landuse % Imperviousness
CC100	10	40
CC101	40	40
CC102	35	35
CC103	80	80
CC201	60	60
CC202	15	80
CC301	2	40
CC302	40	40
CC303	2	40
CC401	55	55

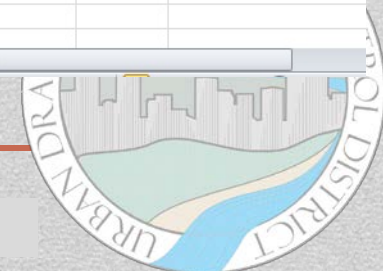
Raingage	Return Period (Years)	1 Hr Depths (in)	6 Hr Depths (in)
DIA	WQ	0.6	N/A
	2	0.98	1.38
	5	1.38	1.93
	10	1.63	2.19
	25	2	2.68
	50	2.31	3.02
Sedalia	100	2.67	3.37
	500	3.31	4.18
	WQ	0.6	N/A
	2	1.05	1.59
	5	1.42	2
	10	1.68	2.3
Denver	25	1.95	2.8
	50	2.28	3.1
	100	2.53	3.43
	500	3.12	4.19
	WQ	0.6	N/A
	2	0.95	1.46
Denver	5	1.35	1.97
	10	1.55	2.32
	25	2	2.84
	50	2.24	3.14
	100	2.58	3.51
	500	3.22	4.36

Enter "X" to Run Scenario	Scenario ID	Land Use (E or F)	Return Period (yr)	Correction Area (Sq.Mi.)
---------------------------------	----------------	----------------------	--------------------------	--------------------------------

(Optional) SWMM
Time Series Inflow
Table "NAME"

The user can then fill
out the table with the
appropriate depths from
UD-Rain or the NOAA
Atlas

Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver



Multiple Runs Sheet

RUN MULTIPLE CUHP AND SWMM SCENARIOS

Instructions on How To Use
Multiple Run Tool

Columns with this color heading are for required user-input

Columns with this color heading are for program-calculated values

Clear Worksheet

Fill Out Subcatchment
Names

Create List of Raingages
with Area Correction

Run Multiple CUHP Scenarios

SWMM Run
Wait Time
(sec)
5

(Optional) SWMM
Time Series Inflow
"Modification Type"
(LU, RP, or LU&RP)

Run Multiple SWMM Scenarios

Enter "X"
to Run
Scenario ID Land Use
(E or F) Return
Period (yr) Correction
Area (Sq.Mi.)

(Optional) SWMM
Time Series Inflow
Table "NAME"

Subcatchment Name	Existing Landuse % Imperviousness	Future Landuse % Imperviousness
CC100	10	40
CC101	40	40
CC102	35	35
CC103	80	80
CC201	60	60
CC202	15	80
CC301	2	40
CC302	40	40
CC303	2	40
CC401	55	55

Raingage	Return Period (Years)	1 Hr Depths (in)	6 Hr Depths (in)
DIA	WQ	0.6	N/A
	2	0.98	1.38
	5	1.38	1.93
	10	1.63	2.19
	25	2	2.68
	50	2.31	3.02
	100	2.67	3.37
Sedalia	500	3.31	4.18
	WQ	0.6	N/A
	2	1.05	1.59
	5	1.42	2
	10	1.68	2.3
	25	1.95	2.8
	50	2.28	3.1
	100	2.53	3.43
	500	3.12	4.19

Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver

The final step is create input file scenarios by selecting an ID, Landuse, return period and correction area for each scenario.



Multiple Runs Sheet

RUN MULTIPLE CUHP AND SWMM SCENARIOS

Instructions on How To Use
Multiple Run Tool

Columns with this color heading are for required user-input

Columns with this color heading are for program-calculated values

Clear Worksheet

Fill Out Subcatchment
Names

Create List of Raingages
with Area Correction

Run Multiple CUHP Scenarios

Run Multiple SWMM Scenarios

SWMM Run
Wait Time
(sec)

(Optional) SWMM
Time Series Inflow
"Modification Type"
(LU, RP, or LU&RP)

(Optional) SWMM
Time Series Inflow
Table "NAME"

Subcatchment Name	Existing Landuse % Imperviousness	Future Landuse % Imperviousness
CC100	10	40
CC101	40	40
CC102	35	35
CC103	80	80
CC201	60	60
CC202	15	80
CC301	2	40
CC302	40	40
CC303	2	40
CC401	55	55

Raingage	Return Period (Years)	1 Hr Depths (in)	6 Hr Depths (in)
DIA	WQ	0.6	N/A
	2	0.98	1.38
	5	1.38	1.93
	10	1.63	2.19
	25	2	2.68
	50	2.31	3.02
	100	2.67	3.37
Sedalia	WQ	0.6	N/A
	2	1.05	1.59
	5	1.42	2
	10	1.68	2.3
	25	1.95	2.8
	50	2.28	3.1
	100	2.53	3.43
	500	3.12	4.19

Enter "X" to Run	Scenario	Land Use (E or F)	Return Period (yr)	Correction Area (Sq.Mi.)
Scenario	ID	(E or F)		

Comment Denver International Airport (DIA)				
1Hr Depth	2.67 inches	2hr Depth	2.91 inches	
6Hr Depth	3.37 inches	3hr Depth	3.09 inches	
Correction Area	53 Sq. Mi.			
Return Period	100 Years			
Time	Adjusted Depth	Unadjusted Depth		
0:05	0.0305	0.0267		
0:10	0.0916	0.0801		
0:15	0.1405	0.1228		
0:20	0.2110	0.2136		
0:25	0.2155	0.3738		
0:30	0.3847	0.6675		

Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver

The final step is create input file scenarios by selecting an ID, Landuse, return period and correction area for each scenario.



Multiple Runs Sheet

RUN MULTIPLE CUHP AND SWMM SCENARIOS

Instructions on How To Use Multiple Run Tool

Columns with this color heading are for required user-input
Columns with this color heading are for program-calculated values

Clear Worksheet

Fill Out Subcatchment Names

Create List of Raingages with Area Correction

Run Multiple CUHP Scenarios

Run Multiple SWMM Scenarios

SWMM Run Wait Time (sec)
5

(Optional) SWMM Time Series Inflow "Modification Type" (LU, RP, or LU&RP)

(Optional) SWMM Time Series Inflow Table "NAME"

Subcatchment Name	Existing Landuse % Imperviousness	Future Landuse % Imperviousness
CC100	10	40
CC101	40	40
CC102	35	35
CC103	80	80
CC201	60	60
CC202	15	80
CC301	2	40
CC302	40	40
CC303	2	40
CC401	55	55

Raingage	Return Period (Years)	1 Hr Depths (in)	6 Hr Depths (in)
Sedalia	3	1.42	2
	10	1.68	2.3
	25	1.95	2.8
	50	2.28	3.1
	100	2.53	3.43
	500	3.12	4.19

Enter "X" to Run Scenario	Scenario ID	Land Use (E or F)	Return Period (yr)	Correction Area (Sq.Mi.)
	1	E	2	0
	2	E	2	5
	3	E	2	25
	4	E	2	53
	5	E	5	0
	6	E	5	5
	7	E	5	25
	8	E	5	53
	9	E	10	0
	10	E	10	5
X	11	E	10	25
X	12	E	10	53
X	13	E	25	0
X	14	E	25	5
X	15	E	25	25
X	16	E	25	53

CUHP 2005

CUHP has Run Successfully for 56 Scenarios.

OK

Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver

Once all input scenarios are created, a push of the top button creates all of the CUHP output files.



Multiple Run Summary Results

Subcatchment CC100																
flow in cfs																
time in minutes	1_Ex_2yr_0mi^2	2_Ex_2yr_5mi^2	3_Ex_2yr_25mi^2	4_Ex_2yr_53mi^2	5_Ex_5yr_0mi^2	6_Ex_5yr_5mi^2	7_Ex_5yr_25mi^2	8_Ex_5yr_53mi^2	9_Ex_10yr_0mi^2	10_Ex_10yr_5mi^2	11_Ex_10yr_25mi^2	12_Ex_10yr_53mi^2	13_Ex_25yr_0mi^2	14_Ex_25yr_5mi^2	15_Ex_25yr_25mi^2	16_Ex_25yr_53mi^2
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.0
5	0.02	0.01	0.01	0.00	0.39	0.17	0.01	0.01	0.90	0.44	0.01	0.01	0.13	0.13	0.01	0.0
6	0.17	0.04	0.01	0.01	1.06	0.50	0.01	0.01	1.77	1.07	0.11	0.01	2.11	2.11	0.89	0.4
7	0.24	0.07	0.01	0.01	1.29	0.67	0.02	0.01	2.02	1.32	0.20	0.01	3.45	3.45	1.60	0.9
8	0.25	0.09	0.01	0.01	1.25	0.68	0.05	0.01	1.93	1.32	0.25	0.01	4.00	4.00	2.17	1.3
9	0.22	0.08	0.01	0.01	1.11	0.62	0.07	0.01	1.76	1.23	0.27	0.01	3.91	3.91	2.43	1.6
10	0.19	0.07	0.01	0.01	0.98	0.56	0.09	0.01	1.57	1.11	0.28	0.01	3.75	3.75	2.59	1.8
11	0.16	0.06	0.01	0.01	0.86	0.50	0.10	0.01	1.39	1.00	0.28	0.03	3.41	3.41	2.50	1.8
12	0.14	0.05	0.01	0.01	0.75	0.44	0.09	0.01	1.25	0.90	0.28	0.06	3.06	3.06	2.35	1.7
13	0.12	0.05	0.01	0.01	0.67	0.39	0.09	0.01	1.14	0.84	0.28	0.09	2.79	2.79	2.21	1.7
14	0.11	0.04	0.01	0.01	0.59	0.35	0.09	0.01	1.03	0.77	0.28	0.12	2.48	2.48	2.01	1.5
15	0.10	0.04	0.01	0.01	0.51	0.31	0.08	0.01	0.92	0.71	0.29	0.14	2.17	2.17	1.80	1.4
16	0.08	0.03	0.01	0.01	0.43	0.26	0.07	0.01	0.79	0.62	0.27	0.14	1.85	1.85	1.56	1.2

CUHP summary workbook provides the Storm Hydrograph for each scenario for all Subcatchments



Multiple Runs Sheet

Name	Date modified	Type	Size
1_Ex_2yr_0mi^2_CASFM_Creek_Interface....	1/14/2014 1:20 PM	Text Document	38 KB
1_Ex_2yr_0mi^2_CASFM_Creek_Output.xlsx	1/14/2014 1:20 PM	Microsoft Excel W...	158 KB
2_Ex_2yr_5mi^2_CASFM_Creek_Interface....	1/14/2014 1:20 PM	Text Document	38 KB
2_Ex_2yr_5mi^2_CASFM_Creek_Output.xlsx	1/14/2014 1:20 PM	Microsoft Excel W...	157 KB
3_Ex_2yr_25mi^2_CASFM_Creek_Interfac...	1/14/2014 1:20 PM	Text Document	59 KB
3_Ex_2yr_25mi^2_CASFM_Creek_Output....	1/14/2014 1:20 PM	Microsoft Excel W...	221 KB
4_Ex_2yr_53mi^2_CASFM_Creek_Interfac...	1/14/2014 1:20 PM	Text Document	59 KB
4_Ex_2yr_53mi^2_CASFM_Creek_Output....	1/14/2014 1:20 PM	Microsoft Excel W...	220 KB
5_Ex_5yr_0mi^2_CASFM_Creek_Interface....	1/14/2014 1:20 PM	Text Document	38 KB
5_Ex_5yr_0mi^2_CASFM_Creek_Output.xlsx	1/14/2014 1:20 PM	Microsoft Excel W...	162 KB
6_Ex_5yr_5mi^2_CASFM_Creek_Interface....	1/14/2014 1:20 PM	Text Document	38 KB
6_Ex_5yr_5mi^2_CASFM_Creek_Output.xlsx	1/14/2014 1:20 PM	Microsoft Excel W...	162 KB
7_Ex_5yr_25mi^2_CASFM_Creek_Interface....	1/14/2014 1:20 PM	Text Document	59 KB
7_Ex_5yr_25mi^2_CASFM_Creek_Output....	1/14/2014 1:20 PM	Microsoft Excel W...	221 KB
8_Ex_5yr_53mi^2_CASFM_Creek_Interface....	1/14/2014 1:20 PM	Text Document	59 KB
8_Ex_5yr_53mi^2_CASFM_Creek_Output....	1/14/2014 1:20 PM	Microsoft Excel W...	220 KB
9_Ex_10yr_0mi^2_CASFM_Creek_Interface....	1/14/2014 1:21 PM	Text Document	38 KB
9_Ex_10yr_0mi^2_CASFM_Creek_Output....	1/14/2014 1:21 PM	Microsoft Excel W...	165 KB
10_Ex_10yr_5mi^2_CASFM_Creek_Interfa...	1/14/2014 1:21 PM	Text Document	38 KB

☒ Use Relative Path Names

Output Workbook Filename: .\CASFM_Creek_Output.xlsx

CUHP/SWMM Interface Filename (Optional): .\CASFM_Creek_Interface.txt

EPA SWMM 5 Input Filename (Optional): .\CASFM_Creek.inp

EPA SWMM 5 Application File (Optional): C:\Program Files (x86)\EPA SWMM 5.0\swmm5.exe

SWMM Hydrograph Start Time (Optional): 1/1/2005 12:00 AM

For each scenario CUHP creates the following files:

- Output Summary Workbook (.xlsx)
- SWMM Interface Inflow hydrographs (.txt)

A prefix is added to each output file in the form of:
RunID_Landuse_RetPeriod_CorrectionArea



Multiple Runs Sheet

RUN MULTIPLE CUHP AND SWMM SCENARIOS

Instructions on How To Use Multiple Run Tool

Columns with this color heading are for required user-input
Columns with this color heading are for program-calculated values

Clear Worksheet

SWMM Run Wait Time (sec)
5

(Optional) SWMM Time Series Inflow "Modification Type" (LU, RP, or LU&RP)

(Optional) SWMM Time Series Inflow Table "NAME"

Run Multiple CUHP Scenarios

Run Multiple SWMM Scenarios

Fill Out Subcatchment Names

Create List of Raingages with Area Correction

Subcatchment Name	Existing Landuse % Imperviousness	Future Landuse % Imperviousness
CC100	10	40
CC101	40	40
CC102	35	35
CC103	80	80
CC201	60	60
CC202	15	80
CC301	2	40
CC302	40	40
CC303	2	40
CC401	55	55

Raingage	Return Period (Years)	1 Hr Depths (in)	6 Hr Depths (in)
	WQ	0.6	N/A
	2	0.98	1.38

Enter "X" to Run Scenario	Scenario ID	Land Use (E or F)	Return Period (yr)	Correction Area (Sq.Mi.)
X	1	E	2	0
X	2	E	2	5
X	3	E	2	25
X	4	E	2	53
X	5	E	5	0
X	6	E	5	5
X	7	E	5	25
X	8	E	5	53
X	9	E	10	0
X	10	E	10	5
X	11	E	10	25
X	12	E	10	53
X	13	E	25	0
X	14	E	25	5
X	15	E	25	25
X	16	E	25	53

CUHP 2005

The SWMM Model has Run Successfully for 56 Scenarios.

OK

Sedalia	25	1.95	2.8
	50	2.28	3.1
	100	2.53	3.43
	500	3.12	4.19

Intro Raingages Subcatchments Multiple Runs DIA Sedalia Denver

Once all CUHP scenarios have run successfully, a push of the bottom button creates all of the SWMM output files.



Multiple Run Summary Results

EPA	STORM	WATER	MANAGEMENT	MODEL	-	VERSION	5 (Build	5.0.022)

Scenario	ID	=	1_Ex_2yr_0mi^2_CASFM_Creek					

NOTE:	The	summary	statistics	displayed	in	this	report	are
based	on	results	found	at	every	computational	time	step,
not	just	on	results	from	each	reporting	time	step.

Analysis	Options							

Flow	Units	.....	CFS					
Process	Models:							
Rainfall/Rur	.....	NO						
Snowmelt	.....	NO						
Groundwater	.....	NO						
Flow	Routing	.....	YES					
Ponding	Allowed	.....	NO					
Water	Quality	.....	NO					
Flow	Routing	Method	.....	KINWAVE				
Starting	Date	.....	JAN-01-2005	0:00:00				

Multiple SWMM Run Summary 1_Ex_2yr_0mi^2 2_Ex_2yr_5mi^2 3_Ex_2yr_25mi^2 4_Ex_2yr_53mi^2

SWMM summary workbook copies SWMM report files into a blank spreadsheet



Multiple Runs Sheet

Name	Date modified	Type	Size
1_Ex_2yr_0mi^2_CASFM_Creek.ini	1/14/2014 1:19 PM	Configuration sett...	4 KB
1_Ex_2yr_0mi^2_CASFM_Creek.inp	1/14/2014 2:06 PM	INP File	9 KB
1_Ex_2yr_0mi^2_CASFM_Creek.out	1/14/2014 2:06 PM	OUT File	79 KB
1_Ex_2yr_0mi^2_CASFM_Creek.rpt	1/14/2014 2:06 PM	RPT File	9 KB
1_Ex_2yr_0mi^2_CASFM_Creek_Interface...	1/14/2014 1:20 PM	Text Document	38 KB
1_Ex_2yr_0mi^2_CASFM_Creek_Output.xlsx	1/14/2014 1:20 PM	Microsoft Excel W...	158 KB
2_Ex_2yr_5mi^2_CASFM_Creek.ini	1/14/2014 1:19 PM	Configuration sett...	4 KB
2_Ex_2yr_5mi^2_CASFM_Creek.inp	1/14/2014 2:06 PM	INP File	9 KB
2_Ex_2yr_5mi^2_CASFM_Creek.out	1/14/2014 2:06 PM	OUT File	79 KB
2_Ex_2yr_5mi^2_CASFM_Creek.rpt	1/14/2014 2:06 PM	RPT File	9 KB
2_Ex_2yr_5mi^2_CASFM_Creek_Interface...	1/14/2014 1:20 PM	Text Document	38 KB
2_Ex_2yr_5mi^2_CASFM_Creek_Output.xlsx	1/14/2014 1:20 PM	Microsoft Excel W...	157 KB
<input checked="" type="checkbox"/> Use Relative Path Names Output Workbook Filename: .\CASFM_Creek_Output.xlsx CUHP/SWMM Interface Filename (Optional): .\CASFM_Creek_Interface.txt EPA SWMM 5 Input Filename (Optional): .\CASFM_Creek.inp EPA SWMM 5 Application File (Optional): C:\Program Files (x86)\EPA SWMM 5.0\swmm5.exe SWMM Hydrograph Start Time (Optional): 1/1/2005 12:00 AM			
3_Ex_2yr_25mi^2_CASFM_Creek.ini	1/14/2014 1:19 PM	Configuration sett...	4 KB
3_Ex_2yr_25mi^2_CASFM_Creek.inp	1/14/2014 2:06 PM	INP File	9 KB
3_Ex_2yr_25mi^2_CASFM_Creek.out	1/14/2014 2:06 PM	OUT File	79 KB
3_Ex_2yr_25mi^2_CASFM_Creek.rpt	1/14/2014 2:06 PM	RPT File	9 KB
3_Ex_2yr_25mi^2_CASFM_Creek_Interface...	1/14/2014 1:20 PM	Text Document	38 KB
3_Ex_2yr_25mi^2_CASFM_Creek_Output.xlsx	1/14/2014 1:20 PM	Microsoft Excel W...	221 KB
4_Ex_2yr_53mi^2_CASFM_Creek.ini	1/14/2014 1:19 PM	Configuration sett...	4 KB

For each scenario SWMM creates the following files:

- Input (.inp)
- Settings (.ini)
- Output (.out)
- Report (.rpt)

A prefix is added to each output file in the form of:
RunID_Landuse_RetPeriod_CorrectionArea



Multiple Runs Sheet

RUN MULTIPLE CUHP AND SWMM SCENARIOS

Instructions on How To Use
Multiple Run Tool

Columns with this color heading are for required user-input
Columns with this color heading are for program-calculated values

Clear Worksheet

Run Multiple CUHP Scenarios

Run Multiple SWMM Scenarios

SWMM Run Wait Time (sec)
5

(Optional) SWMM Time Series Inflow "Modification Type" (LU, RP, or LU&RP)

(Optional) SWMM Time Series Inflow Table "NAME"

Fill Out Subcatchment Names

Create List of Raingages with Area Correction

Subcatchment Name	Existing Landuse % Imperviousness	Future Landuse % Imperviousness
CC100	10	40
CC101	40	40
CC102	35	35
CC103	80	80
CC201	60	60
CC202	15	80
CC301	2	40
CC302	40	40
CC303	2	40
CC401	55	55

Raingage	Return Period (Years)	1 Hr Depths (in)	6 Hr Depths (in)
DIA	WQ	0.6	N/A
	2	0.98	1.38
	5	1.38	1.93
	10	1.63	2.19
	25	2	2.68
	50	2.31	3.02
	100	2.67	3.37
	500	3.31	4.18
Sedalia	WQ	0.6	N/A
	2	1.05	1.59
	5	1.42	2
	10	1.68	2.3
	25	1.95	2.8
	50	2.28	3.1
	100	2.53	3.43
	500	3.12	4.19

Enter "X" to Run Scenario	Scenario ID	Land Use (E or F)	Return Period (yr)	Correction Area (Sq.Mi.)
X	1	E	2	0
X	2	E	2	5
X	3	E	2	25
X	4	E	2	53
X	5	E	5	0
X	6	E	5	5
X	7	E	5	25
X	8	E	5	53
X	9	E	10	0
X	10	E	10	5
X	11	E	10	25
X	12	E	10	53
X	13	E	25	0
X	14	E	25	5
X	15	E	25	25
X	16	E	25	53

Wait Time ensures that the entire SWMM report file is copied to the summary workbook prior to starting the next scenario.



Multiple Runs Sheet

The screenshot displays the 'Multiple Runs Sheet' software interface. On the left, a sidebar lists various tools: Hydraulics, Quality, Curves, Time Series, Time Patterns, and Map Labels. The 'Time Series' section is expanded, showing a list of time series names, with 'CASFM Creek_Fut_2yr' selected. The 'Time Series Editor' dialog box is open, showing the 'Time Series Name' as 'CASFM Creek_Fut_2yr' and the 'Description' as 'CASFM Creek Future 2-Year'. The 'Use external data file named below' checkbox is unchecked. The 'Enter time series data in the table below' checkbox is checked. The table below shows a list of dates and times with corresponding values. The 'Multiple SWMM Scenarios' table is also visible, showing a list of scenarios with columns for Scenario ID, Land Use (E or F), Return Period (yr), and Correction Area (Sq.Mi.).

Time Series Editor

Time Series Name: CASFM Creek_Fut_2yr

Description: CASFM Creek Future 2-Year

☐ Use external data file named below

☒ Enter time series data in the table below

No dates means times are relative to start of simulation.

Date (M/D/Y)	Time (H:M)	Value
1/1/2005	0:05:00	0
1/1/2005	0:10:00	1.4
1/1/2005	0:15:00	12.17
1/1/2005	0:20:00	50.72
1/1/2005	0:25:00	107.26
1/1/2005	0:30:00	152.63
1/1/2005	0:35:00	189.48
1/1/2005	0:40:00	234.63
1/1/2005	0:45:00	343.22

Multiple SWMM Scenarios

Scenario ID	Land Use (E or F)	Return Period (yr)	Correction Area (Sq.Mi.)
1	E	2	0
2	E	2	5
3	E	2	25
4	E	2	53
5	E	5	0
6	E	5	5
7	E	5	25
8	E	5	53
9	E	10	0
10	E	10	5
11	E	10	25
12	E	10	53
13	E	25	0
14	E	25	5
15	E	25	25
16	E	25	53

SWMM Run Wait Time (sec): 5

(Optional) SWMM Time Series Inflow "Modification Type" (LU, RP, or LU&RP): RP

(Optional) SWMM Time Series Inflow Table "NAME": CASFM Creek

Changes the Time Series Inflow Hydrograph for each scenario depending on either Landuse, Return Period, or Both



Summary

- Standalone Excel spreadsheet that can be opened and run without installing software
- Simplified user interface with new tools to check for reasonableness of inputs
- Updated code to be consistent with USDCM
- Tool to check consistency between SWMM nodes and SWMM input file
- Running multiple scenarios from a single input file enhances file management and prevents repetitive input mistakes for large watershed studies



Questions ? or Comments !

