Specifying Meteorological Data in HEC-RAS

Workshop

1 Objective

This workshop will help students learn how to specify meteorological data including precipitation, evapotranspiration, and wind. In addition, the workshop also includes how to setup infiltration. This work was developed with HEC-RAS Version 6.2. However, the same steps should work for Versions 6.0 and 6.1.

2 Base Plan

The terrain data (and a depth map) that was used in the HEC-RAS model for Bald Eagle Creek is show below. Evaluate the existing plan.

- 1. **Open** HEC-RAS and the "BaldEagleDamBrk.prj" project.
- 2. **Run** the "Single 2D Area" plan.
- 3. Animate the results in RAS Mapper.

Note the model setup including the geometry, dam, computational options and tolerances, and boundary conditions. Note where water is spilling into the town. The base plan is setup as a single 2D area with the dam modeled as an SA/2D Connection. The reservoir has a single inflow hydrograph. The dam as a Time-Series Controlled Gate Openings. The downstream boundary is a Normal Depth boundary condition.

3 Gridded Precipitation

This task will add gridded precipitation to the base model plan. The gridded precipitation DSS file has already been created.

- 4. Create a new Unsteady Flow Data file and call it "Gridded Precip".
- 5. Within the **Meteorological Data** tab of the **Unsteady Flow Data** editor, click on the drop-down menu next to **Precipitation/Evapotranspiration** and select **Enable**.

上 Unsteady Flow Data - Gridded Precip
File Options Help
Description:
Boundary Conditions Initial Conditions Meteorological Data Observed Data
Precipitation/Evapotranspiration: Enable Vind: No Wind Forces Finable
Meteorological Stations (red <mark>Disable on the series data)</mark>
Create/Edit Stations Rasterization Parameters (Optional) Plot S

The **Precipitation** and **Evapotranspiration** fields will be enabled under **Meterological Variables**.

6. In the section called **Precipitation**, select **Gridded** in the **Mode** drop-down menu as shown below.

Create/Edit Stations	Rasterization Parameters (Optional)	Plot Stations
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Precipitation		
Mode: None 💌	1	
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Mode: Gridded Constant	4 _	
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Precipitation	Gridded Data - DSS	
	,	
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Mode: Gridded Tata Gridded Data Source: DSS T DSS Data Filename:		<u>ن</u> ف ۲

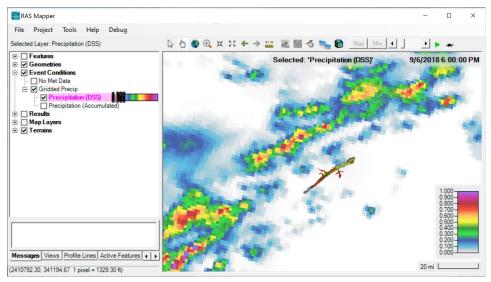
- 7. Make sure the **Source** drop-down menu is set to **DSS**.
- 8. In the section **DSS Data** click on the open icon is and select the DSS file called "precip.2018.09.dss" located in the **Precipitation** folder of the project folder. The **HEC-RAS DSS Viewer** will open. Set the DSS path parts as shown in the figure below. Then double-click on any of the rows to set the path and click on the **OK** button.

	FileName						FileDate	Time Wi			
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Seneral	Filter:					Ap	ply				
ast App	lied Filter:					Path	Count: 720 / 5	138			
		-					0.15				
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		Grid 🚬	SHG 💌	MAR			<u> </u>	NEXRAD 💌	<u> </u>	<u> </u>	
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2	precip.2018.09	Grid	SHG	MARFC	PRECIP	01SEP2018:0100	01SEP2018:0200	NEXRAD	PER_CUM	mm	
3	precip.2018.09	Grid	SHG	MARFC	PRECIP	01SEP2018:0200	01SEP2018:0300	NEXRAD	PER_CUM	mm	
4	precip.2018.09	Grid	SHG	MARFC	PRECIP	01SEP2018:0300	01SEP2018:0400	NEXRAD	PER_CUM	mm	
5	precip.2018.09	Grid	SHG	MARFC	PRECIP	01SEP2018:0400	01SEP2018:0500	NEXRAD	PER_CUM	mm	
6	precip.2018.09	Grid	SHG	MARFC	PRECIP	01SEP2018:0500	01SEP2018:0600	NEXRAD	PER_CUM	mm	
7	precip.2018.09	Grid	SHG	MARFC	PRECIP	01SEP2018:0600	01SEP2018:0700	NEXRAD	PER_CUM	mm	
9	precip.2018.09	Grid	SHG	MARFC	PRECIP	01SEP2018:0700	01SEP2018:0800	NEXRAD	PER_CUM	mm	
10	precip.2018.09	Grid	SHG	MARFC	PRECIP	01SEP2018:0800	01SEP2018:0900	NEXRAD	PER_CUM	mm	
11	precip.2018.09	Grid	SHG	MARFC	PRECIP	01SEP2018:0900	01SEP2018:1000	NEXRAD	PER_CUM	mm	
12	precip.2018.09	Grid	SHG	MARFC	PRECIP	01SEP2018:1000	01SEP2018:1100	NEXRAD	PER_CUM	mm	
13	precip.2018.09	Grid	SHG	MARFC	PRECIP	01SEP2018:1100	01SEP2018:1200	NEXRAD	PER_CUM	mm	
14	precip.2018.09	Grid	SHG	MARFC	PRECIP	01SEP2018:1200	01SEP2018:1300	NEXRAD	PER_CUM	mm	

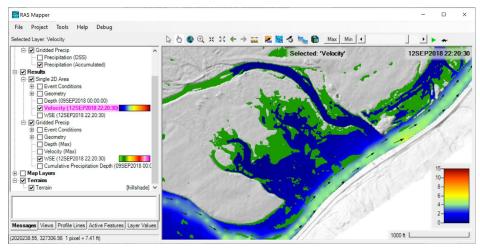
The **Unsteady Flow Data** editor should look something like the figure below.

Lunsteady Flow Data - Gridded Precip	-		×
File Options Help			
Description:	÷	. Appl	y Data
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Precipitation/Evapotranspiration: Enable 💌 Wind: No Wind Forces 💌			
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Create/Edit Stations Rasterization Parameters (Optional) Plot Sta	ations		
Meteorological Variables			-
Precipitation			
Mode: Gridded 💌 Ratio (Optional): Gridded Data - DSS			
Gridded Data			
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Filename: orkshops\2.7-W-Meteorological Data\Solution\Precipitation\precip.2 Path: //SHG/MARFC/PRECIP/01SEP2018:0000/01SEP2018:0100/NEXRAD/		dss 🖻	1
			<u>- </u>
Evapotranspiration			
Mode: None			

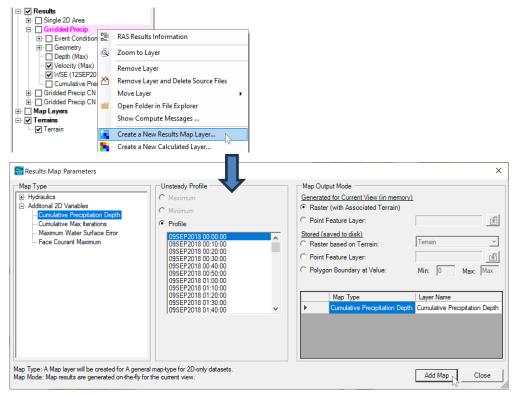
- 9. Save and close the Unsteady Flow Data editor.
- 10. Create a new plan called "Gridded Precip" with the new unsteady flow data and run it.
- 11. Before inspecting the results, inspect the gridded precipitation in RAS Mapper. Open RAS Mapper and select the Gridded Precip layer under the Event Conditions layer. For the precipitation to display properly it will be necessary to adjust the surface colormap. Animate the precipitation. The gridded precipitation should look something like the figure below.



12. Inspect the HEC-RAS results and compare to the plans with and without precipitation. Use a different colormap for the water surface elevations highlight the differences or compare the extents of the water surface and velocity layers. See the example below.



13. Add the Cumulative Precipitation Depth result in RAS Mapper by rightclicking on the "Gridded Precip" plan and selecting Create a New Results Map Layer... from the menu. In the Results Map Parameters editor, select Cumulative Precipitation Depth under the Additional 2D Variables layer, click on Add Map, and Close the editor.



- 14. Adjust the colormap and inspect the spatial distribution of the precipitation.
- 15. Compare the results with and without precipitation by plotting time-series and spatial maps in **RAS Mapper**.

4 Infiltration

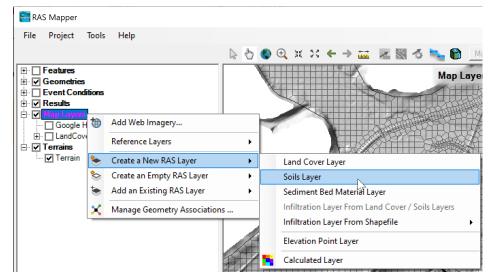
The SCS Curve Number method can be parameterized using a combination of both Land Cover and Hydrologic Soils data or only one of those datasets. In this workshop both the Land Cover and Hydrologic Soils data are utilized. First, a **Soils Layer** is created based on the USDA gSSURGO database

(<u>https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2</u> _053628). Then, an **SCS Curve Number Infiltration Layer** is created based on both the **Soils Layer** and the **Land Cover** classification layers.

4.1 Soils Layer

This section covers how to create or load an existing Soils Layer in RAS Mapper.

16. Create a **Soils Layer** by right-clicking on **Map Layers** and selecting **Create a New RAS Layer**.



17. In the **Browse for Land Classification Files** window, select the GSSURGO folder called gSSURGO_PA.gdb in the Soils Data folder in the main project directory.

Browse for Land Class	ification Files		×
← → • ↑ <mark>.</mark> «	Solution > Soils Data > gSSURGO_PA.gdb	୍ ଓ ୪	Search gSSURGO_PA.gdb
Organize 👻 New f	older		= • 🔳 💡
Soils Data	^ Name	Date modified	Type Size ^
This PC	a00000059.col_index.atx	10/22/2019 9:03 AM	ATX File
3D Objects	a00000059.gdbindexes	10/22/2019 8:53 AM	GDBINDEXES File
	a00000059.gdbtable	10/22/2019 9:03 AM	GDBTABLE File 196
Desktop	a0000059.gdbtablx	10/22/2019 9:11 AM	GDBTABLX File
Documents	a00000059.row_index.atx	10/22/2019 9:03 AM	ATX File
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Fil	e name: gdb	~ GSS	SURGO (*.*) ~
			Open Cancel

18. In the Create a **New Soils Layer** editor, click on the add button as shown in the figure below and select the file in the **Soils Data** folder in the main project directory.

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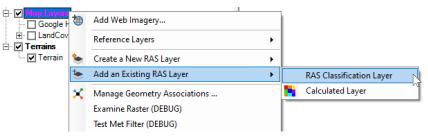
19. Replace "/" with "-" and "(none)" with "NoData" in the Classifications to dashes as shown in the figure below.

put Files					
Import Extents:	errains 🗨		(None) 💌	Hydrologic Grou	•
Filename	Projection	Info	Naming Std.	Name Field	
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≤ gdb •					
<u>•</u>					
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nique Classification N	ames for Selected File	0	utput File		
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Name Field 3 A 3/D D	Classification B A B-D		RAS Classification IoData 3 3-D	0 1 2	
Name Field 3 A 3/D C	Classification B A B-D D		AS Classification No Data	0 1 2 3 4	-
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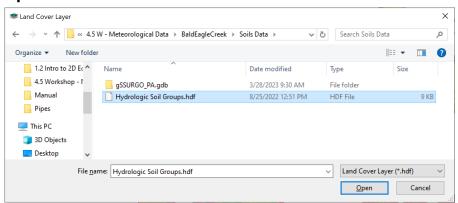
- 20. Click on the **Open Folder** icon and save the **Filename** as "Soils.hdf" in the **Soils Data** folder in the main project directory.
- 21. In the **Create a New Soils Layer** window shown above, click **Create** and then **Close** in the **Compute Window** below.

Compute Window - Creating Mannings n Layer 'Soils.hdf'		×
Computation Task	hh:mm:ss	^
PREPROCESSING: Ensuring rasters are in the correct projection gdb is a vector file. Projection will be done on-the-fly if necessary. Preprocessing complete.	0	
Creating output file Soils.tif Adding Overlays	5 3	
Creating soils.hdf Land cover Layer complete!	9	~
,	Cl	ose

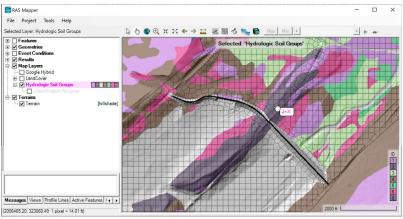
22. To demonstrate how to load an existing **Soils Layer** and to prevent any issues with the previously created **Soils Layer**, an existing **Soils Layer** is loaded and used in the workshop. First remove the Soils layer from RAS Mapper. To add an existing Soils Layer open **RAS Mapper**, right-click on the **Map Layers**, and select **Add Existing RAS Layer | RAS Classification Layer** as shown in the figure below.



23. Select the Soils Data layer called "Hydrologic Soil Groups.hdf" in the folder called "Soils Data" in the BaldEagleCreek folder as shown below and select Open.



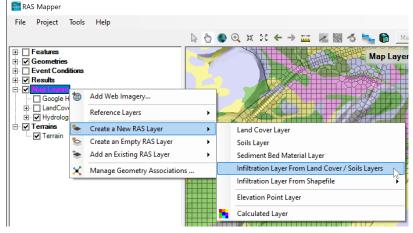
24. Inspect the **Soils Layer** in **RAS Mapper**. The layer should look something like the figure below.



4.2 Infiltration Layer

This section describes how to create or add an existing infiltration layer. In order to avoid any issues with the created infiltration layer, the workshop will continue with a previously created infiltration layer.

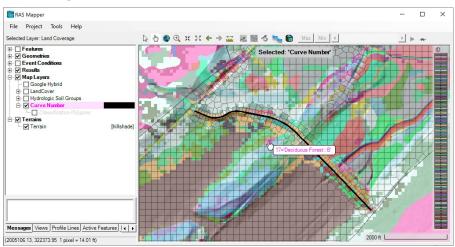
25. Create an Infiltration Layer by right-clicking on the Map Layer and selecting Create a New RAS Layer | Infiltration Layer From Land Cover / Soils Layers as shown in the figure below.



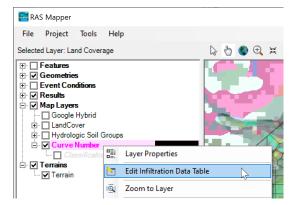
26. In the **Infiltration Layer** window, set the options as shown in the figure below and click **Create**. As mentioned previously, it is not necessary to utility both the **Land Cover** and **Soils Layers** for the **SCS Curve Number** method, but more accurate to do so.

Infiltration Layer				_		×
Infiltration Method:	SCS Curve Number	·				
Land Cover Layer:	LandCover	Soils Layer:		Hydrologic Soil	Groups	•
Time between rainfall e	vents to reestablish initial los	s and soil moisture (hrs):	48			
Infiltration Layer Name	C:\\Workshops\4.5 W - Me	eteorological Data\BaldEagle	eCreek\Soils [1		
				Create	Canc	

27. Inspect the Infiltration Layer in RAS Mapper. The layer should look something like the figure below.



28. Right-click on the SCS Curve Number Infiltration Layer and select Edit Infiltration Data Table.



29. The **Classification Parameters** window will appear. The table contains all the land classifications which need to be assigned SCS Curve Number infiltration parameters.

	d Area Edits		۲	arameter: All Paran	ieters
ID	Name	Curve Number	Abstraction Ratio	Minimum Infiltration Rate (in./hr)	
124	Barren Land Rock-Sand-Clay				
125	Barren Land Rock-Sand-Clay				
126	Barren Land Rock-Sand-Clay				
127	Barren Land Rock-Sand-Clay				
128	Main Channel : NoData				
129	Main Channel : B				
130	Main Channel : A				
131	Main Channel : B-D				
132	Main Channel : D				
133	Main Channel : C				
134	Main Channel : C-D				
135	Main Channel : A-D				

30. For the purposes of the workshop, an Excel spreadsheet has been provided with the SCS Curve Number parameters. Open the spreadsheet called "Curve Number.xlsx" located in the **Infiltration** folder of the main project directory and copy the values to the **Classification Parameters** window. Then Click **OK** to accept the values in the table.

19	• : × ✓ fx				Classificatio	on Parameters			
	АВ	C	D	E	Selected	Area Edits		Parameter: All Pa	irameters
1 1	D Name	Curve Number	Abstraction Ratio	Minimum Infiltration Rate (in/hr)	<u></u>	+ × 📐 🖼 -	.00		Minimum
2	0 NoData	75				Name	Curve Number	Abstraction Ratio	Infiltration Rate
3	1 NoData : B	75	0.1	0.12					(in/hr)
4	2 NoData : A	75	0.1	0.12	0	NoData	75	0.1	0.12
5	3 NoData : B-D	75			1	NoData : B	75	0.1	0.12
6	4 NoData : D	75							
7	5 NoData : C	75			2	NoData : A	75	0.1	0.12
8	6 NoData : C-D	75			3	NoData : B-D	75	0.1	0.12
9	7 NoData : A-D	75				NoData : D	75	0.1	0.12
10	8 Mixed Forest : NoData	79							
11	9 Mixed Forest : B	60				NoData : C	75	0.1	0.12
	10 Mixed Forest : A	36			/	NoData : C-D	75	0.1	0.12
	11 Mixed Forest : B-D 12 Mixed Forest : D	65							
	12 Mixed Forest : D 13 Mixed Forest : C	79				NoData : A-D	75	0.1	0.12
	13 Mixed Forest : C-D	73			8	Mixed Forest : NoData	79	0.2	0.12
	14 Mixed Forest : C-D 15 Mixed Forest : A-D	40			9	Mixed Forest : B	60	0.2	0.12
	16 Deciduous Forest : NoData	70							
	17 Deciduous Forest : B	66			10	Mixed Forest : A	36	0.2	0.12
	18 Deciduous Forest : A	45			11	Mixed Forest : B-D	65	0.2	0.12
	19 Deciduous Forest : B-D	70			12	Mixed Forest : D	79	0.2	0.12
	20 Deciduous Forest : D	83				Reset Time (hrs): 48	13	0.4	0.12

- 31. To demonstrate how to load an existing Infiltration Layer and to prevent any issues with the previously created Infiltration Layer, an existing Infiltration Layer is loaded and used in the workshop. First, open RAS Mapper and remove the previously created Infiltration Layer. Then rightclick on the Map layer and select Add Existing RAS Layer | RAS Classification Layer. Select the Infiltration Layer called "Curve Number.pdf" located in the folder "Infiltration" folder and select Open.
- 32. To utilize the infiltration parameters, the **Infiltration Layer** needs to be "associated" with a geometry. Preserve the existing geometry without infiltration calculation, and create a new one by right-clicking on the geometry and selecting **Save Geometry As...**

🚟 RAS Mapper			
File Project Tools Help			
Selected Layer: Single 2D Area - No Infiltratio	on	🦯 🔓 🏷 🔍 ж 🛛	53
 ➡ Features ➡ Geometries 			
Single 2D Area - No Infiltration Event Conditions		RAS Geometry Properties	
Results Map Layers	0	Edit Geometry	
	Q	Validate Geometry	
I I Terrain	G	Save Geometry As	
	×	Delete Geometry	
		View Geometry in 3D	

33. In the **Save Data As** window, save the new Geometry as "Single 2D Area – Curve Number".

📑 Save Data As		×
Enter a unique Name for the new Geometry:		
Single 2D Area - Curve Number		
	ОК	Cancel

W – Meteorological Data

34. Right-click on the root **Geometry** node in **RAS Mapper** and select **Manage Geometry Associations** or go click on the menu **Project** | **Manage Layer Associations...** as shown below.

🚟 RAS Mapper			😽 RAS M	Mapper			
File Project Tools	Help		File F	Project	Tools	Help	
		la 🗄 🍕		Set F	projection	n	
Image: Constraint of the second se	Add New Geo Manage Geon	metry hetry Associations		Add Dow Crea Crea Crea	nload Da te New R te New G te a New	ce Layer	•
				Man	age Resu	ults Maps	N

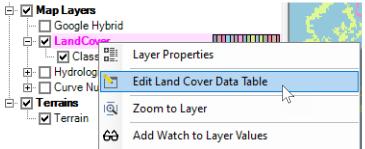
35. Set the **Infiltration** layer to **Curve Number** for the corresponding **Geometry** as shown in the figure below.

Туре	RAS Geometry Layers	Terrain	Manning's n	Infiltration	% Impervious	Sediment Bed Material Layer
Geometry	Single 2D Area - No Infiltration	Terrain 💌	LandCover 💌	(None) 💌	(None) 💌	(None)
Geometry	Single 2D Area - Curve Number	Terrain 💌	LandCover 💌	Curve Number 🔻	(None) 💌	(None) 💌
Results	Single 2D Area	Terrain 💌	LandCover	(None)	(None)	(None)
Results	Gridded Precip	Terrain 🔻	LandCover	(None)	(None)	(None)

36. Set the **% Impervious Layer** to **Land Cover** for the corresponding Geometry as shown in the figure below and click **Close**.

Туре	RAS Geometry Layers	Terrain	Manning's n	Infiltration	% Impervious	Sediment Bed Material Laye
Geometry	Single 2D Area - No Infiltration	Terrain 💌	LandCover 💌	(None) 💌	(None) 💌	(None)
Geometry	Single 2D Area - Curve Number	Terrain 💌	LandCover 💌	Curve Number 💌	LandCover	(None)
D	Circle 3D Area	T-min -	1	(Mara)	(Marra)	()

37. Right-click on the Land Cover layer and select Edit Land Cover Data Table.



38. The **% Impervious** values have already been filled. Inspect the values.

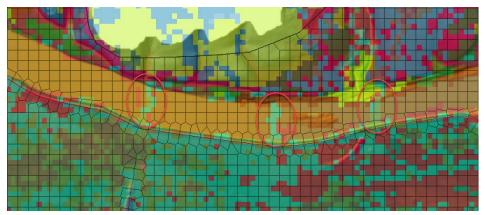
Classific	cation Parameters		×
	cted Area Edits	Parameter: A	l Parameters
ID	Name	ManningsN	Percent Impervious
0	NoData	0.035	0
43	Mixed Forest	0.12	0
41	Deciduous Forest	0.1	0
21	Developed, Open Space	0.035	0
42	Evergreen Forest	0.15	0
11	Open Water	0.035	100
52	Shrub-Scrub	0.05	0
81	Pasture-Hay	0.045	0
71	Grassland-Herbaceous	0.04	0
00	C IN 1 I C	0.05	· ·
			OK Cancel

<u>Question</u>: Why are the impervious values set to 100 for open water?

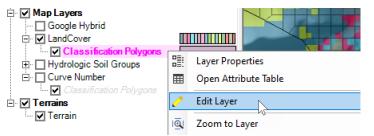
39. Inspect the **Land Cover** layer by setting the opacity/transparency to 50% and overlaying the layer the Terrain. Do this by right-clicking on the layer and selecting **Layer Properties**. Then close the Layer Properties window.

Map Layers Google Hybrid Classification Layer Properties Hydrologic Soil G			
SandCover - Layer Properties		_	×
Visualization and Information Source Files			
Point: Line: Fill:	Options		
Label Features with Attribute Column(s)			
Surface Image: Surface Image: Description of the surface Image: Surface Image: Description of the surface			
ID Edit			
Opacity: 50%			
Contours / Hillshade			
Plot Contours Interval: 5 V Color:			
Plot Hillshade Z Factor: Edit			
Copy Symbology Paste Symbology Reset Symbology			

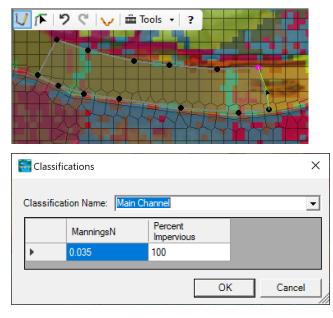
40. Find areas in the channels that do not correspond to Open Water (see examples in figure below).



41. Practice fixing areas like this using **Classification Polygons**. Right-click on **Classification Polygons** and select **Edit Layer**. Then click on the **Add New Feature** tool **U**.



42. Draw polygons over the areas which need to corrected. After each polygon is drawn, an editor will appear to select the **Classification** for each polygon. Select the **Main Channel** classification and clock **OK**.



43. After creating a few polygons, right-click again on the **Classification Polygons** layer, and select **Stop Editing**.

⊡ • 🗹 Map Layers 🔲 Google Hybrid	_	
🚊 🔽 LandCover		
Classification Polygons		
🗄 🔲 Hydrologic Soil Groups		Layer Properties
🖻 🔲 Curve Number	Ħ	Open Attribute Table
Classification Polygons		
🖻 🔽 Terrains	•	Stop Editing
Errain	١ <u>@</u>	Zoom to Laver

44. The window below will appear. Click on **Yes** to save the edits.

Save Edits (Classification Polygons)	×
Do you want to Save Edits for 'Classification Polygons'?	
Yes No Cancel	

45. Create a new plan called "Gridded Precip CN" with the new **Geometry** called "Single 2D Area – Curve Number" and run it.

上 Unsteady Flow Analysis File Options Help		×
Plan: Gridded Precip CN	Short ID: Gridded Precip CN	
Geometry File:	Single 2D Area - Curve Number	•
Unsteady Flow File:	Gridded Precip	-
Programs to Run ✓ Geometry Preprocessor ✓ Unsteady Flow Simulation ☐ Sediment Post Processor	Plan Description	^

46. Inspect the results and compare to the previous plans using profile and timeseries plots in **RAS Mapper**.

<u>*Questions:*</u> How do the water level time-series compare between the three plans? Which water levels are higher and where the largest differences?

<u>Questions</u>: Why is there no infiltration in the channels?

<u>Questions</u>: Animate the Cumulative Infiltration Depth. Why does it reset to zero at some point during the simulation?

5 Potential Evapotranspiration

In this section, a time-series of potential evapotranspiration is added. The timeseries is specified at a single meteorological station.

47. Create a new **Unsteady Flow Data** file called "Gridded Precip Evap".

لمحرا	Insteady Flow Data - Gridded Precip
File	Options Help
	New Unsteady Flow Data
	Open Unsteady Flow Data
	Save Unsteady Flow Data
	Save Unsteady Flow Data As
	Rename Unsteady Flow Title
	Delete Unsteady Flow File

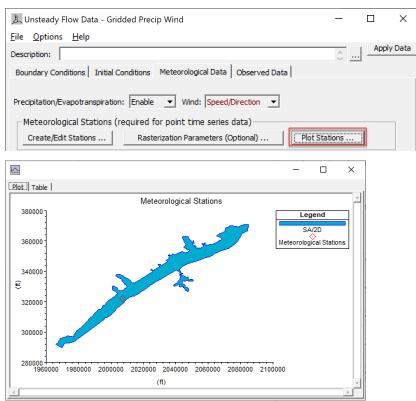
48. Next, create a **Meteorological Station**, by clicking on the button labeled **Create/Edit Stations...**

Lunsteady Flow Data - Gridded Precip Wind	-		\times
<u>File Options H</u> elp			
Description:	÷	Apply I	Data
Boundary Conditions Initial Conditions Meteorological Data Observed Data			
Precipitation/Evapotranspiration: Enable 💌 Wind: Speed/Direction 💌			
Meteorological Stations (required for point time series data)			
Create/Edit Stations Rasterization Parameters (Optional) Plot Stat	tions		

49. In the **Meteorological Stations** editor, click on the new button, call it Sayers Dam, and enter either the WGS84 or projected coordinates shown below.

Meteorological Stations		
Detailed Table		
Point Name: Sayers Dam		
Gauge Height [required	f for wind] (m): 10.	
GIS Coordinates (enter coordinates	one way)	
WGS84	Projected (set SRS in RAS Mapper)	
Latitude (-S, +N): 41.05	or X: 2007114.58	
Longitude (-W, +E): -77.61	Y: 321872.32	
Plot Point Locations Sort Points	By Name	OK Cancel

50. Click on the **Plot Stations** button.



51. In the **Evapotranspiration** section, set the **Mode** is set to **Point**, and click on the button to expand the section as shown below.

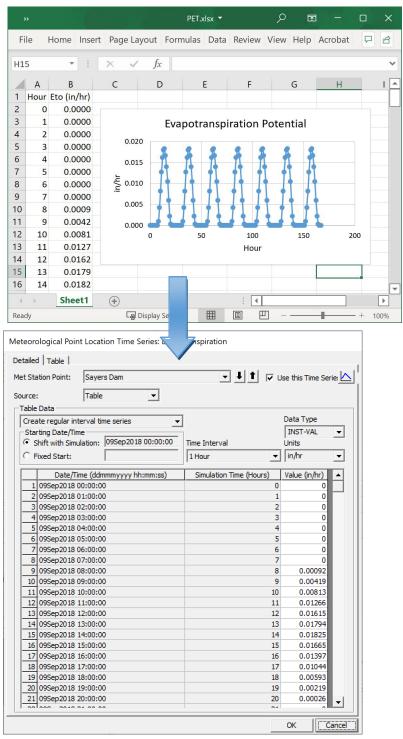
Aeteorological Variables	
Precipitation	
Mode: Gridded 💽 Gridded Data - DSS	
Evapotranspiration	
Mode: Point 🗾 Point Time Series Mode (Nearest)	

52. Click on the **Edit** button shown below.

Meteorological Variables		
Precipitation		
Mode: Gridded 💌 Gridd	led Data - DSS	
- Evapotranspiration		
Mode: Point 💌 Ratio ((Optional): Point Time Series Mode (Nearest)	
Point Time Series Data		
Interpolation Method: Nearest	Edit .	🔼 👘
Station Name	Summary	Edit
1 Sayers Dam	Table Data: data range = 0.0000 to 0.0183 (in/hr)	

Notes: In Version 6.2, the time-series plots of Meterological Variables does not work. In addition the **Ratio** option does not work. Both of these issues have been fixed in Version 6.3.

53. In the **Meteorological Point Location Time Series** window, enter the hourly potential evapotranspiration data for **Sayers Dam** as shown in the figure below. The data has been provided in an Excel spreadsheet called "PET.xlsx" located in the **Potential Evapotranspiration** folder of the main project directory. Once all the data is entered click on the **OK** button.



54. Open the **Unsteady Flow Analysis** editor and create a new **Plan** called "Gridded Precip CN Evap".

上 Unsteady Flow Analysis				×
File Options Help				
Plan: Gridded Precip CN Evap		Short ID:	Gridded Precip CN Evap	
Geometry File:	Single 2D Area - Curve	Number		-
Unsteady Flow File:	Gridded Precip Evap			-
Programs to Run ✓ Geometry Preprocessor ✓ Unsteady Flow Simulation	Plan Description			^

- 55. **Save** the plan and run it.
- 56. Compare the results with the previous plans in **RAS Mapper**. Specifically, plot the **Cumulative Evapotranspiration Depth** at various points.

<u>*Questions</u></u>: How do the water level time-series compare between the plans with and without evapotranspiration?*</u>