



DRAINAGE DESIGN MANAGEMENT SYSTEM FOR WINDOWS VERSION 5.6.0

TUTORIAL # 6 CUSTOMIZING HEC-RAS TABLE FOR DDMSW



KVL Consultants, Inc.

CUSTOMIZING HEC-RAS TABLE FOR DDMSW

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CUSTOMIZING HEC-RAS TABLE FOR DDMSW

DATE UPDATED: 04/25/2018

1.0 INTRODUCTION

This tutorial outlines the procedure in customizing a HEC-RAS table that identifies which hydraulic parameters are to be included in the table as well as the column wise order by which these parameters are defined. HEC-RAS can save the custom format defined by the user so that it serves as a template that can be accessed and used anytime. The imported data could be used for river mechanics analysis that includes scour, sediment yield, riprap sizing, launchable riprap, and lateral erosion.

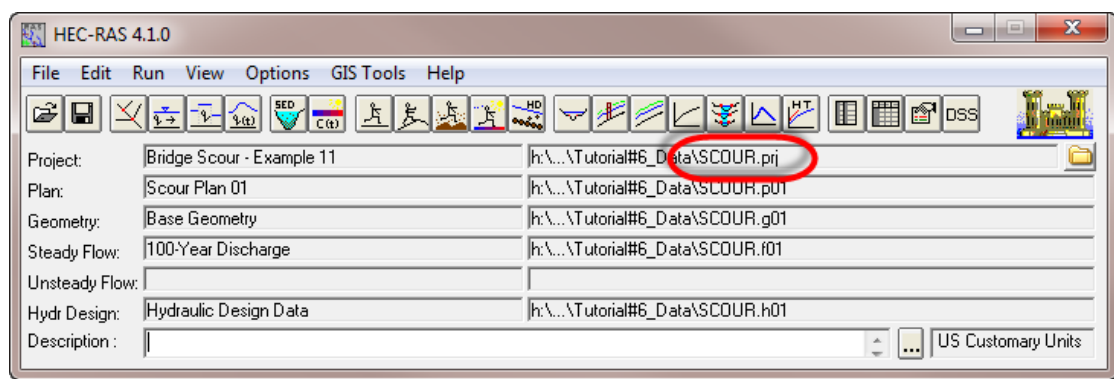
The content of this tutorial document was tested and updated using **HEC-RAS 5.0.3** and **DDMSW 5.6.0**.

2.0 PROJECT FILES

The project files needed for this tutorial are assembled in a compressed file called “SCOUR.zip”. The most important file is the “SCOUR.prj” which defines various addresses to access required project component files (e.g., *.p01, *.g01, *.f01, etc). If the “SCOUR.prj” and other associated files do not exist, unzip the provided “SCOUR.zip” file.

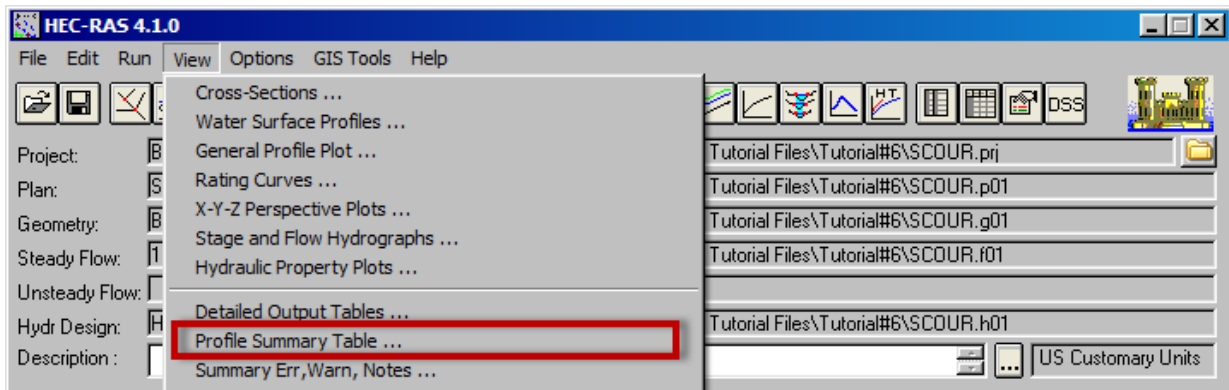
3.0 OPEN A HEC-RAS PROJECT

After launching the HEC-RAS program, open a HEC-RAS project. For purposes of illustration using this tutorial, let us use a pre-packaged HEC-RAS project called, “SCOUR.prj”. Make sure that the project has already been run.

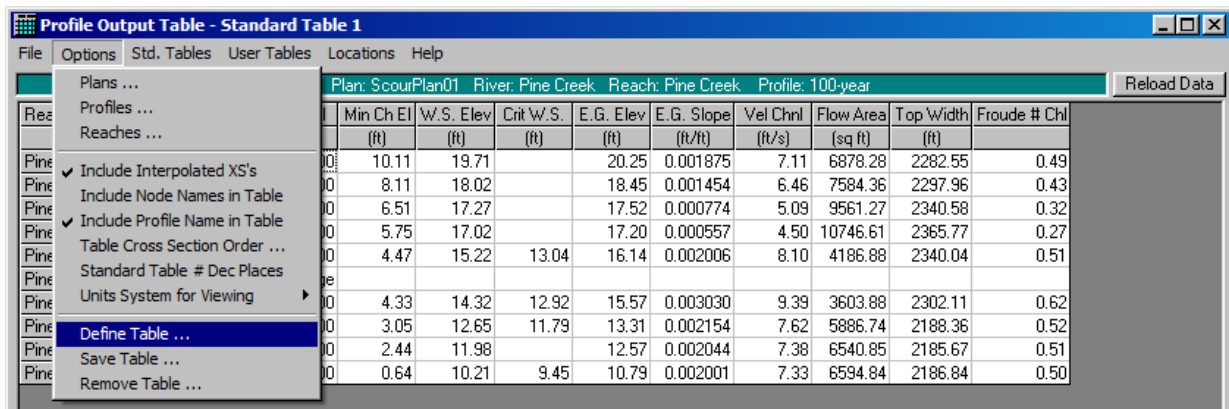


4.0 OPEN THE PROJECT OUTPUT TABLE AND CREATE A CUSTOM TABLE

4.1 To start the customization of the table, open the **PROFILE OUTPUT TABLE** form (**View → Profile Summary Table ...**).



4.2 On the **PROFILE OUTPUT TABLE** form, open the Create a Table Heading form (*'Options → Define Table ...'*).



4.3 On the **CREATE A TABLE HEADING** form, click the *'Clear All Table Headings'* button at the middle of the form.

Create a Table Heading

Select Variables | Additional Options |

Table Column Headings					
Column	1	2	3	4	5
Variable	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev
Units	(cfs)	(ft)	(ft)	(ft)	(ft)
Decimal Pts	2	2	2	2	2

Available Variables

Variable	Description
# Barrels	Number of barrels in a culvert.
Alpha	Alpha - energy weighting coefficient.
Area	Flow area of the entire cross section including ineffective flow.
Area Channel	Flow area of the main channel including ineffective flow.
Area Left	Flow area of the left overbank including ineffective flow.
Area Right	Flow area of the right overbank including ineffective flow.
Base WS	Water surface for first profile (used in comparison of encroachments).
Beta	Beta - momentum weighting coefficient.
BR Open Area	Total area of the entire bridge opening.
BR Open Vel	Average velocity inside the bridge opening (Maximum of BU and BD).
Br Sel Method	Selected bridge method.
Breach Avg Velocit	Average flow velocity through a breach.
Breach Bottom El	Bottom Elevation of weir breach.
Breach CL	Center line of weir breach.
Breach Flow Area	Flow area through a breach.
Breach SSL	Left side slope of weir breach.
Breach SSR	Right side slope of weir breach.
Breach Top El	Top Elevation of weir breach.

- 4.4 Once all the table headings have been cleared, find the “Q *Total*” variable in the list of available variables shown below.

Create a Table Heading

Select Variables | Additional Options

Table Column Headings					
Column	1	2	3	4	5
Variable					
Units					
Decimal Pts					

◀ ▶

Delete Column Insert Column Clear All Table Headings

Available Variables Filter:

Q Lat RC	Lateral rating curve flow.
Q Leaving Total	Total flow leaving in a lateral structure including all gates, culverts and laterals.
Q Left	Flow in left overbank.
Q Perc Chan	Percent of flow in main channel.
Q Perc L	Percent of flow in left overbank.
Q Perc R	Percent of flow in right overbank.
Q Pump Group	Pump group flow.
Q Pump Station	Total flow in all pump groups in a pump station.
Q Right	Flow in right overbank.
Q Total	Total flow in cross section.
Q US	Flow in cross section upstream of a lateral structure.
Q Weir	Flow over the weir.
R. Freeboard	The freeboard in the main channel at the right bank.
R. Levee Frbrd	The freeboard before the right levee is over-topped.
Right Sta Eff	Furthest right station that still has effective flow.
Right Station	Right station of the cross section.
ROB Elev	The ground elevation at the right bank of the main channel.
SA Area	Surface area of a storage area.

OK Cancel

- 4.5 Double-click on the “Q Total” variable. This action should insert the “Q Total” variable in the first available column of the table (Column 1). Please note that the default number of decimal points is 2.

Create a Table Heading

Select Variables | Additional Options

Table Column Headings					
Column	1	2	3	4	5
Variable	Q Total				
Units	(cfs)				
Decimal Pts	2				

Available Variables

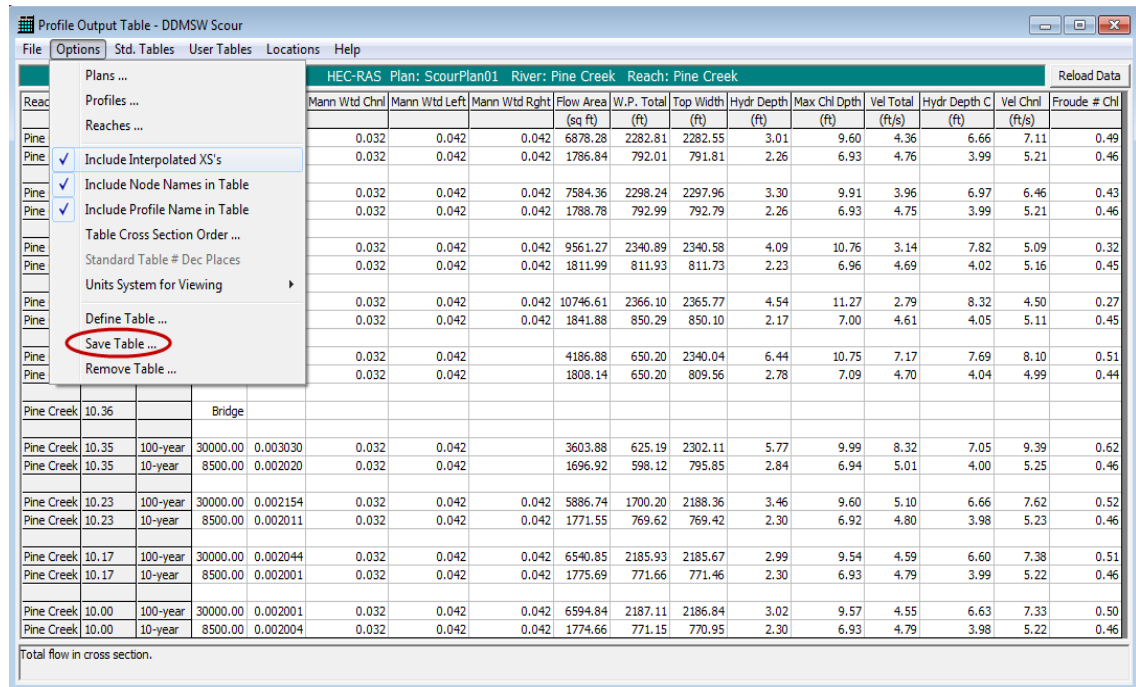
Q Lat RC	Lateral rating curve flow.
Q Leaving Total	Total flow leaving in a lateral structure including all gates, culverts and laterals.
Q Left	Flow in left overbank.
Q Perc Chan	Percent of flow in main channel.
Q Perc L	Percent of flow in left overbank.
Q Perc R	Percent of flow in right overbank.
Q Pump Group	Pump group flow.
Q Pump Station	Total flow in all pump groups in a pump station.
Q Right	Flow in right overbank.
Q Total	Total flow in cross section.
Q US	Flow in cross section upstream of a lateral structure.
Q Weir	Flow over the weir.
R. Freeboard	The freeboard in the main channel at the right bank.
R. Levee Frbrd	The freeboard before the right levee is over-topped.
Right Sta Eff	Furthest right station that still has effective flow.
Right Station	Right station of the cross section.
ROB Elev	The ground elevation at the right bank of the main channel.
SA Area	Surface area of a storage area.

- 4.6 Repeat Steps 4.4 and 4.5 for the following variables: “E.G. Slope”, “Mann Wtd Chnl”, “Mann Wtd Left”, “Mann Wtd Right”, “Flow Area”, “W.P. Total”, “Top Width”, “Hydr Depth”, “Max Chl Dpth”, “Vel Total”, “Hydr Depth C”, “Vel Chnl”, and “Froude# Chnl”. **IMPORTANT:** The variables must be entered in the listed order; otherwise, the DDMSW program will not be able to import the data correctly. Click the ‘OK’ button to return to the **PROFILE OUTPUT TABLE** form.

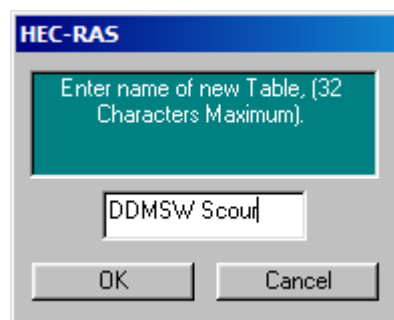
The **PROFILE OUTPUT TABLE FORM** should look like the one shown below.

Profile Output Table - Standard Table 1															
File Options Std. Tables Locations Help															
HEC-RAS Plan: ScourPlan01 River: Pine Creek Reach: Pine Creek															Reload Data
Reach	River Sta	Profile	Q Total (cfs)	E.G. Slope (ft/ft)	Mann Wtd Chnl	Mann Wtd Left	Mann Wtd Right	Flow Area (sq ft)	W.P. Total (ft)	Top Width (ft)	Hydr Depth (ft)	Max Chl Dpth (ft)	Vel Total (ft/s)	Hydr Depth C (ft)	Froude # Chl
Pine Creek	10.90	100-year	30000.00	0.001875	0.032	0.042	0.042	6878.28	2282.81	2282.55	3.01	9.60	4.36	6.66	7.11
Pine Creek	10.90	10-year	8500.00	0.001993	0.032	0.042	0.042	1786.84	792.01	791.81	2.26	6.93	4.76	3.99	5.21
Pine Creek	10.71	100-year	30000.00	0.001454	0.032	0.042	0.042	7584.36	2298.24	2297.96	3.30	9.91	3.96	6.97	6.46
Pine Creek	10.71	10-year	8500.00	0.001989	0.032	0.042	0.042	1788.78	792.99	792.79	2.26	6.93	4.75	3.99	5.21
Pine Creek	10.55	100-year	30000.00	0.000774	0.032	0.042	0.042	9561.27	2340.89	2340.58	4.09	10.76	3.14	7.82	5.09
Pine Creek	10.55	10-year	8500.00	0.001936	0.032	0.042	0.042	1811.99	811.93	811.73	2.23	6.96	4.69	4.02	5.16
Pine Creek	10.48	100-year	30000.00	0.000557	0.032	0.042	0.042	10746.61	2366.10	2365.77	4.54	11.27	2.79	8.32	4.50
Pine Creek	10.48	10-year	8500.00	0.001875	0.032	0.042	0.042	1841.88	850.29	850.10	2.17	7.00	4.61	4.05	5.11
Pine Creek	10.37	100-year	30000.00	0.002006	0.032	0.042		4186.88	650.20	2340.04	6.44	10.75	7.17	7.69	8.10
Pine Creek	10.37	10-year	8500.00	0.001799	0.032	0.042		1808.14	650.20	809.56	2.78	7.09	4.70	4.04	4.99
Pine Creek	10.36		Bridge												
Pine Creek	10.35	100-year	30000.00	0.003030	0.032	0.042		3603.88	625.19	2302.11	5.77	9.99	8.32	7.05	9.39
Pine Creek	10.35	10-year	8500.00	0.002020	0.032	0.042		1696.92	598.12	795.85	2.84	6.94	5.01	4.00	5.25
Pine Creek	10.23	100-year	30000.00	0.002154	0.032	0.042	0.042	5886.74	1700.20	2188.36	3.46	9.60	5.10	6.66	7.62
Pine Creek	10.23	10-year	8500.00	0.002011	0.032	0.042	0.042	1771.55	769.62	769.42	2.30	6.92	4.80	3.98	5.23
Pine Creek	10.17	100-year	30000.00	0.002044	0.032	0.042	0.042	6540.85	2185.93	2185.67	2.99	9.54	4.59	6.60	7.38
Pine Creek	10.17	10-year	8500.00	0.002001	0.032	0.042	0.042	1775.69	771.66	771.46	2.30	6.93	4.79	3.99	5.22
Pine Creek	10.00	100-year	30000.00	0.002001	0.032	0.042	0.042	6594.84	2187.11	2186.84	3.02	9.57	4.55	6.63	7.33
Pine Creek	10.00	10-year	8500.00	0.002004	0.032	0.042	0.042	1774.66	771.15	770.95	2.30	6.93	4.79	3.98	5.22
Total flow in cross section.															

- 4.7 To save this Table, click on the **‘Save Table ...’** (**‘Options ➔ Save Table ...’**).



- 4.8 Name the Table, such as **“DDMSW Scour”**, and click **‘OK’**. The format of the custom Table is now saved in the computer’s memory.



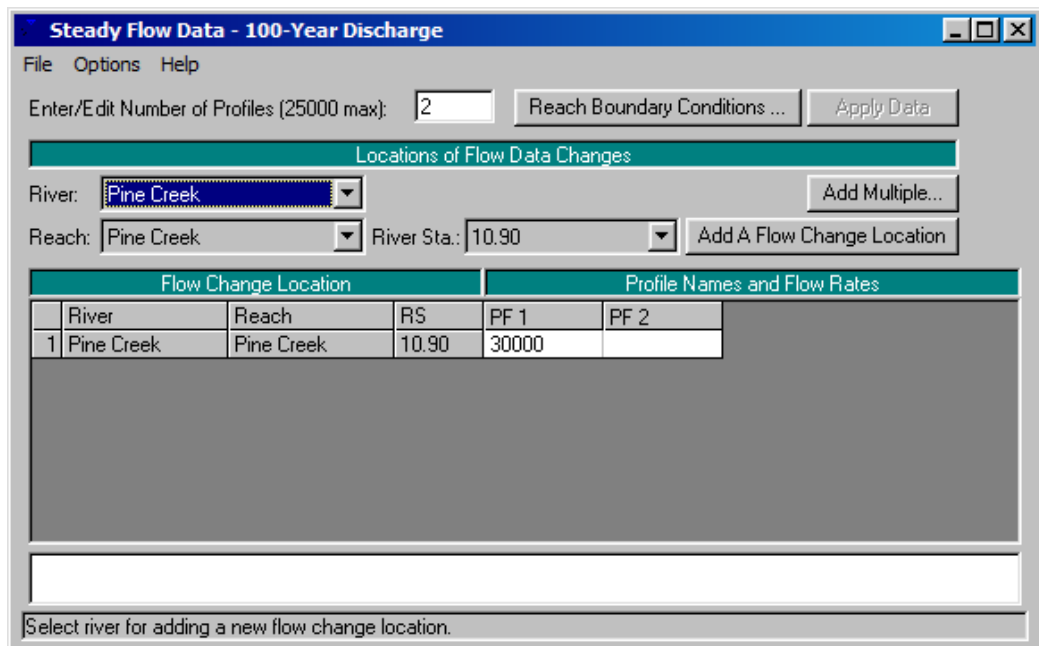
- 4.9 When HEC-RAS is started again, the **“DDMSW Scour”** table can be selected from the **“User Tables”** menu on the **PROFILE OUTPUT TABLE** form.

Profile Output Table - DDMSW Scour															
File Options Std. Tables User Tables Locations Help															
✓ DDMSW Scour RAS Plan: ScourPlan01 River: Pine Creek Reach: Pine Creek															
Reach	River Sta	Profile	Q Total (cfs)	E.G. Slope (ft/ft)	Mann Wtd Chnl	Mann Wtd Left	Mann Wtd Right	Flow Area (sq ft)	W.P. Total (ft)	Top Width (ft)	Hydr Depth (ft)	Max Chl Dpth (ft)	Vel Total (ft/s)	Hydr Depth C	Froude # Chl
Pine Creek	10.90	100-year	30000.00	0.001875	0.032	0.042	0.042	6878.28	2282.81	2282.55	3.01	9.60	4.36	6.66	7.11
Pine Creek	10.90	10-year	8500.00	0.001993	0.032	0.042	0.042	1786.84	792.01	791.81	2.26	6.93	4.76	3.99	5.21
Pine Creek	10.71	100-year	30000.00	0.001454	0.032	0.042	0.042	7584.36	2298.24	2297.96	3.30	9.91	3.96	6.97	6.46
Pine Creek	10.71	10-year	8500.00	0.001989	0.032	0.042	0.042	1788.78	792.99	792.79	2.26	6.93	4.75	3.99	5.21
Pine Creek	10.55	100-year	30000.00	0.000774	0.032	0.042	0.042	9561.27	2340.89	2340.58	4.09	10.76	3.14	7.82	5.09
Pine Creek	10.55	10-year	8500.00	0.001936	0.032	0.042	0.042	1811.99	811.93	811.73	2.23	6.96	4.69	4.02	5.16
Pine Creek	10.48	100-year	30000.00	0.000557	0.032	0.042	0.042	10746.61	2366.10	2365.77	4.54	11.27	2.79	8.32	4.50
Pine Creek	10.48	10-year	8500.00	0.001875	0.032	0.042	0.042	1841.88	850.29	850.10	2.17	7.00	4.61	4.05	5.11
Pine Creek	10.37	100-year	30000.00	0.002006	0.032	0.042		4186.88	650.20	2340.04	6.44	10.75	7.17	7.69	8.10
Pine Creek	10.37	10-year	8500.00	0.001799	0.032	0.042		1808.14	650.20	809.56	2.78	7.09	4.70	4.04	4.99
Pine Creek	10.36		Bridge												
Pine Creek	10.35	100-year	30000.00	0.003030	0.032	0.042		3603.88	625.19	2302.11	5.77	9.99	8.32	7.05	9.39
Pine Creek	10.35	10-year	8500.00	0.002020	0.032	0.042		1696.92	598.12	795.85	2.84	6.94	5.01	4.00	5.25
Pine Creek	10.23	100-year	30000.00	0.002154	0.032	0.042	0.042	5886.74	1700.20	2188.36	3.46	9.60	5.10	6.66	7.62
Pine Creek	10.23	10-year	8500.00	0.002011	0.032	0.042	0.042	1771.55	769.62	769.42	2.30	6.92	4.80	3.98	5.23
Pine Creek	10.17	100-year	30000.00	0.002044	0.032	0.042	0.042	6540.85	2185.93	2185.67	2.99	9.54	4.59	6.60	7.38
Pine Creek	10.17	10-year	8500.00	0.002001	0.032	0.042	0.042	1775.69	771.66	771.46	2.30	6.93	4.79	3.99	5.22
Pine Creek	10.00	100-year	30000.00	0.002001	0.032	0.042	0.042	6594.84	2187.11	2186.84	3.02	9.57	4.55	6.63	7.33
Pine Creek	10.00	10-year	8500.00	0.002004	0.032	0.042	0.042	1774.66	771.15	770.95	2.30	6.93	4.79	3.98	5.22
Total flow in cross section.															

5.0 PRE-PROCESSING OF THE HEC-RAS DATA BEFORE IMPORT

The following steps show additional pre-processing within the HEC-RAS program before the table can be imported into the DDMSW program.

- 5.1 Two profiles in the HEC-RAS model must be specified. One profile for the design discharge (usually the 100-year flow rate), and the bankfull discharge (usually taken as the 10-year flow rate). This can be done by entering "2" in the **"Enter/Edit Number of Profiles (25000 max):"** textbox field on the **STEADY FLOW DATA** form (**Edit → Steady Flow Data ...**) and press the **'Apply Data'** button. Note: Enter/Edit Number of profiles is 32000 in HEC-RAS 5.0.3.



Steady Flow Data - 100-Year Discharge

File Options Help

Enter/Edit Number of Profiles (25000 max): Reach Boundary Conditions ...

Locations of Flow Data Changes

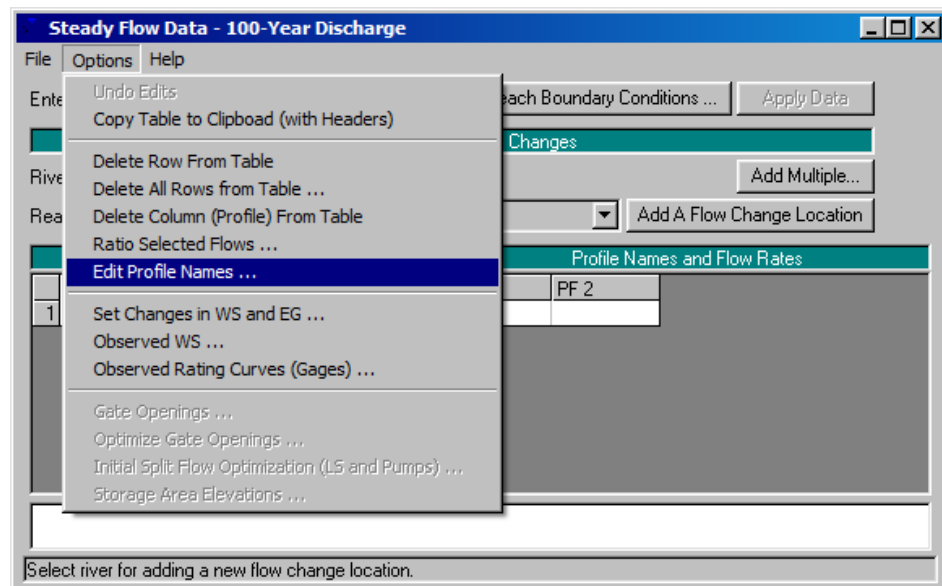
River:

Reach: River Sta.:

Flow Change Location			Profile Names and Flow Rates		
	River	Reach	RS	PF 1	PF 2
1	Pine Creek	Pine Creek	10.90	30000	

Select river for adding a new flow change location.

The profiles can be given more descriptive names by using the ***“Edit Profile Names ...”*** (***Options → Edit Profile Names ...***).



Steady Flow Data - 100-Year Discharge

File Options Help

Undo Edits
Copy Table to Clipboard (with Headers)
Delete Row From Table
Delete All Rows from Table ...
Delete Column (Profile) From Table
Ratio Selected Flows ...
Edit Profile Names ...
Set Changes in WS and EG ...
Observed WS ...
Observed Rating Curves (Gages) ...
Gate Openings ...
Optimize Gate Openings ...
Initial Split Flow Optimization (LS and Pumps) ...
Storage Area Elevations ...

Each Boundary Conditions ...

Changes

Profile Names and Flow Rates	
	PF 2

Select river for adding a new flow change location.

- 5.2 Enter '100-year' and '10-year' as Profile Names for Profile #1 (PF 1) and Profile #2 (PF 2), respectively. Click **OK** to save. The data should look similar to the figure below. If the data is already shown as below, proceed to step 5.3.

Steady Flow Data - 100-Year Discharge

File Options Help

Enter/Edit Number of Profiles (25000 max): Reach Boundary Conditions ...

Locations of Flow Data Changes

River:

Reach: River Sta.:

Flow Change Location			Profile Names and Flow Rates		
	River	Reach	RS	100-year	10-year
1	Pine Creek	Pine Creek	10.90	30000	8500

Edit Steady flow data for the profiles (cfs)

- 5.3 On the main menu of HEC-RAS, open the **PROFILE OUTPUT TABLE** form ('**View → Profile Summary Table ...**') to access the "**DDMSW Scour**" template ('**User Tables → DDMSW Scour**'). If the "**DDMSW Scour**" table is not the active table (i.e., not checked), please repeat Step 4.9.

Profile Output Table - DDMSW Scour

File Options Std. Tables **User Tables** Locations Help

☒ DDMSW Scour RAS Plan: ScourPlan01 River: Pine Creek Reach: Pine Creek

Reach	River Sta	Profile	Q Total (cfs)	E.G. Slope (ft/ft)	Mann Wtd Chnl	Mann Wtd Left	Mann Wtd Right	Flow Area (sq ft)	W.P. Total (ft)	Top Width (ft)	Hydr Depth (ft)	Max Chl Dpth (ft)	Vel Total (ft/s)	Hydr Depth C (ft)	Vel Chnl (ft/s)	Froude # Chl
Pine Creek	10.90	100-year	30000.00	0.001875	0.032	0.042	0.042	6878.28	2282.81	2282.55	3.01	9.60	4.36	6.66	7.11	0.49
Pine Creek	10.90	10-year	8500.00	0.001993	0.032	0.042	0.042	1786.84	792.01	791.81	2.26	6.93	4.76	3.99	5.21	0.46
Pine Creek	10.71	100-year	30000.00	0.001454	0.032	0.042	0.042	7584.36	2298.24	2297.96	3.30	9.91	3.96	6.97	6.46	0.43
Pine Creek	10.71	10-year	8500.00	0.001989	0.032	0.042	0.042	1788.78	792.99	792.79	2.26	6.93	4.75	3.99	5.21	0.46
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Pine Creek	10.55	10-year	8500.00	0.001936	0.032	0.042	0.042	1811.99	811.93	811.73	2.23	6.96	4.69	4.02	5.16	0.45
Pine Creek	10.48	100-year	30000.00	0.000557	0.032	0.042	0.042	10746.61	2366.10	2365.77	4.54	11.27	2.79	8.32	4.50	0.27
Pine Creek	10.48	10-year	8500.00	0.001875	0.032	0.042	0.042	1841.88	850.29	850.10	2.17	7.00	4.61	4.05	5.11	0.45
Pine Creek	10.37	100-year	30000.00	0.002006	0.032	0.042		4186.88	650.20	2340.04	6.44	10.75	7.17	7.69	8.10	0.51
Pine Creek	10.37	10-year	8500.00	0.001799	0.032	0.042		1808.14	650.20	809.56	2.78	7.09	4.70	4.04	4.99	0.44
Pine Creek	10.36		Bridge													
Pine Creek	10.35	100-year	30000.00	0.003030	0.032	0.042		3603.88	625.19	2302.11	5.77	9.99	8.32	7.05	9.39	0.62
Pine Creek	10.35	10-year	8500.00	0.002020	0.032	0.042		1696.92	598.12	795.85	2.84	6.94	5.01	4.00	5.25	0.46
Pine Creek	10.23	100-year	30000.00	0.002154	0.032	0.042	0.042	5886.74	1700.20	2188.36	3.46	9.60	5.10	6.66	7.62	0.52
Pine Creek	10.23	10-year	8500.00	0.002011	0.032	0.042	0.042	1771.55	769.62	769.42	2.30	6.92	4.80	3.98	5.23	0.46
Pine Creek	10.17	100-year	30000.00	0.002044	0.032	0.042	0.042	6540.85	2185.93	2185.67	2.99	9.54	4.59	6.60	7.38	0.51
Pine Creek	10.17	10-year	8500.00	0.002001	0.032	0.042	0.042	1775.69	771.66	771.46	2.30	6.93	4.79	3.99	5.22	0.46
Pine Creek	10.00	100-year	30000.00	0.002001	0.032	0.042	0.042	6594.84	2187.11	2186.84	3.02	9.57	4.55	6.63	7.33	0.50
Pine Creek	10.00	10-year	8500.00	0.002004	0.032	0.042	0.042	1774.66	771.15	770.95	2.30	6.93	4.79	3.98	5.22	0.46

Total flow in cross section.

- 5.4 Go to the "**Options**" menu and make sure a check mark is shown next to the "**Include Profile Name in Table**" option.

Profile Output Table - DDMSW Scour

File Options Std. Tables User Tables Locations Help

HEC-RAS Plan: ScourPlan01 River: Pine Creek Reach: Pine Creek Reload Data

Reach	River Sta	Profile	Q Total (cfs)	E.G. Slope (ft/ft)	Mann Wtd Chnl	Mann Wtd Left	Mann Wtd Right	Flow Area (sq ft)	W.P. Total (ft)	Top Width (ft)	Hydr Depth (ft)	Ma
Pine Creek	10.90	100-year	30000.00	0.001875	0.032	0.042	0.042	6878.28	2282.81	2282.55	3.01	
Pine Creek	10.90	10-year	8500.00	0.001993	0.032	0.042	0.042	1786.84	792.01	791.81	2.26	
Pine Creek	10.71	100-year	30000.00	0.001454	0.032	0.042	0.042	7584.36	2298.24	2297.96	3.30	
Pine Creek	10.71	10-year	8500.00	0.001989	0.032	0.042	0.042	1788.78	792.99	792.79	2.26	
Pine Creek	10.55	100-year	30000.00	0.000774	0.032	0.042	0.042	9561.27	2340.89	2340.58	4.09	
Pine Creek	10.55	10-year	8500.00	0.001936	0.032	0.042	0.042	1811.99	811.93	811.73	2.23	
Pine Creek	10.48	100-year	30000.00	0.000557	0.032	0.042	0.042	10746.61	2366.10	2365.77	4.54	
Pine Creek	10.48	10-year	8500.00	0.001875	0.032	0.042	0.042	1841.88	850.29	850.10	2.17	
Pine Creek	10.37	100-year	30000.00	0.002006	0.032	0.042		4186.88	650.20	2340.04	6.44	
Pine Creek	10.37	10-year	8500.00	0.001799	0.032	0.042		1808.14	650.20	809.56	2.78	
Pine Creek	10.36		Bridge									
Pine Creek	10.35	100-year	30000.00	0.003030	0.032	0.042		3603.88	625.19	2302.11	5.77	
Pine Creek	10.35	10-year	8500.00	0.002020	0.032	0.042		1696.92	598.12	795.85	2.84	

Total flow in cross section.

- 5.6 Highlight the data in the entire table (all the data are highlighted in blue). Click the **“Copy to Clipboard (Data and Headings)”** option (**File → Copy to Clipboard (Data and Headings)**) to copy the highlighted data and the headings to the clipboard.

Profile Output Table - DDMSW Scour

File Options Std. Tables User Tables Locations Help

HEC-RAS Plan: ScourPlan01 River: Pine Creek Reach: Pine Creek Reload Data

Reach	River Sta	Profile	Q Total (cfs)	E.G. Slope (ft/ft)	Mann Wtd Chnl	Mann Wtd Left	Mann Wtd Right	Flow Area (sq ft)	W.P. Total (ft)	Top Width (ft)	Hydr Depth (ft)	Max Chl Dpth (ft)	Vel Total (ft/s)	Hydr Depth C (ft)	Vel Chnl (ft/s)	Froude # Chl
Pine Creek	10.90	10-year	8500.00	0.001993	0.032	0.042	0.042	1786.84	792.01	791.81	2.26	6.93	4.76	3.99	5.21	0.46
Pine Creek	10.71	100-year	30000.00	0.001454	0.032	0.042	0.042	7584.36	2298.24	2297.96	3.30	9.91	3.96	6.97	6.46	0.43
Pine Creek	10.71	10-year	8500.00	0.001989	0.032	0.042	0.042	1788.78	792.99	792.79	2.26	6.93	4.75	3.99	5.21	0.46
Pine Creek	10.55	100-year	30000.00	0.000774	0.032	0.042	0.042	9561.27	2340.89	2340.58	4.09	10.76	3.14	7.82	5.09	0.32
Pine Creek	10.55	10-year	8500.00	0.001936	0.032	0.042	0.042	1811.99	811.93	811.73	2.23	6.96	4.69	4.02	5.16	0.45
Pine Creek	10.48	100-year	30000.00	0.000557	0.032	0.042	0.042	10746.61	2366.10	2365.77	4.54	11.27	2.79	8.32	4.50	0.27
Pine Creek	10.48	10-year	8500.00	0.001875	0.032	0.042	0.042	1841.88	850.29	850.10	2.17	7.00	4.61	4.05	5.11	0.45
Pine Creek	10.37	100-year	30000.00	0.002006	0.032	0.042		4186.88	650.20	2340.04	6.44	10.75	7.17	7.69	8.10	0.51
Pine Creek	10.37	10-year	8500.00	0.001799	0.032	0.042		1808.14	650.20	809.56	2.78	7.09	4.70	4.04	4.99	0.44
Pine Creek	10.36		Bridge													
Pine Creek	10.35	100-year	30000.00	0.003030	0.032	0.042		3603.88	625.19	2302.11	5.77	9.99	8.32	7.05	9.39	0.62
Pine Creek	10.35	10-year	8500.00	0.002020	0.032	0.042		1696.92	598.12	795.85	2.84	6.94	5.01	4.00	5.25	0.46
Pine Creek	10.23	100-year	30000.00	0.002154	0.032	0.042	0.042	5886.74	1700.20	2188.36	3.46	9.60	5.10	6.66	7.62	0.52
Pine Creek	10.23	10-year	8500.00	0.002011	0.032	0.042	0.042	1771.55	769.62	769.42	2.30	6.92	4.80	3.98	5.23	0.46
Pine Creek	10.17	100-year	30000.00	0.002944	0.032	0.042	0.042	6540.85	2185.93	2185.67	2.99	9.54	4.59	6.60	7.38	0.51
Pine Creek	10.17	10-year	8500.00	0.002001	0.032	0.042	0.042	1775.69	771.66	771.46	2.30	6.93	4.79	3.99	5.22	0.46
Pine Creek	10.00	100-year	30000.00	0.002001	0.032	0.042	0.042	6594.84	2187.11	2186.84	3.02	9.57	4.55	6.63	7.33	0.50
Pine Creek	10.00	10-year	8500.00	0.002004	0.032	0.042	0.042	1774.66	771.15	770.95	2.30	6.93	4.79	3.98	5.22	0.46

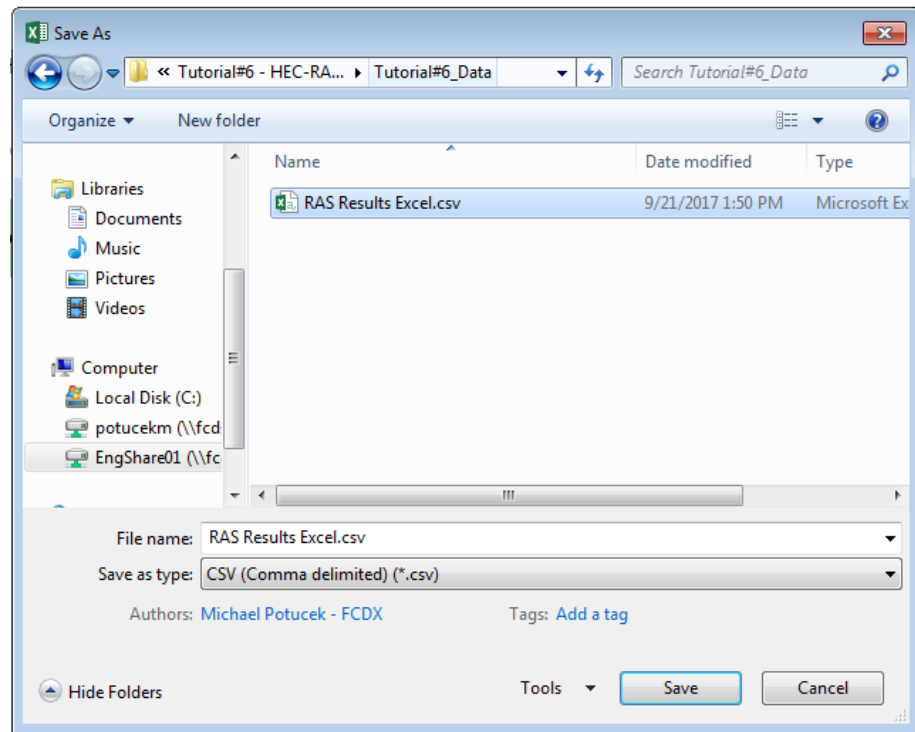
Total flow in cross section.

Please note that if the **“Copy to Clipboard (Data only)”** option is chosen, the columns will not be in the correct format and DDMSW will not be able to import the results.

The Excel file should now look similar to the following file.

	A	B	C	D	E	F	G	H	I	J	K	L
1	HEC-RAS Plan: Existing River: RIVER-1 Reach: Reach-1											
2	Reach	River Sta	Profile	Q Total	W.P. Total	Hydr Dept	Mann Wtc	Flow Area	Max Chl D	E.G. Slope	Hydr Dept	Vel Chnl
3				(cfs)	(ft)	(ft)		(sq ft)	(ft)	(ft/ft)	(ft)	(ft/s)
4	Pine Cree	10.9	100-year	30000	2283.26	3.02	0.031	6898.71	9.61	0.001861	6.67	7.09
5	Pine Cree	10.9	10-year	8500	791.97	2.26	0.024	1786.75	6.93	0.001993	3.99	5.21
6												
7	Pine Cree	10.71	100-year	30000	2300.87	3.35	0.032	7705.07	9.96	0.001394	7.02	6.35
8	Pine Cree	10.71	10-year	8500	793.04	2.26	0.024	1788.87	6.93	0.001988	3.99	5.21
9												
10	Pine Cree	10.55	100-year	30000	2343.96	4.14	0.034	9704.96	10.82	0.000743	7.88	5.01
11	Pine Cree	10.55	10-year	8500	812.23	2.23	0.024	1812.22	6.96	0.001936	4.02	5.16
12												
13	Pine Cree	10.48	100-year	30000	2369.61	4.61	0.035	10912.73	11.34	0.000534	8.39	4.43
14	Pine Cree	10.48	10-year	8500	850.9	2.17	0.023	1842.36	7	0.001875	4.06	5.11
15												
16	Pine Cree	10.37	100-year	30000	650.2	6.45	0.032	4190.02	10.76	0.002001	7.7	8.1
17	Pine Cree	10.37	10-year	8500	650.2	2.78	0.027	1808.31	7.09	0.001799	4.04	4.99
18												
19	Pine Cree	10.36		Bridge								
20												
21	Pine Cree	10.35	100-year	30000	625.19	5.78	0.032	3611.2	10	0.003011	7.06	9.38
22	Pine Cree	10.35	10-year	8500	598.12	2.84	0.027	1696.92	6.94	0.00202	4	5.25
23												
24	Pine Cree	10.23	100-year	30000	1700.2	3.46	0.031	5886.98	9.6	0.002154	6.66	7.62
25	Pine Cree	10.23	10-year	8500	769.62	2.3	0.024	1771.55	6.92	0.002011	3.98	5.23
26												
27	Pine Cree	10.17	100-year	30000	2185.94	2.99	0.03	6540.96	9.54	0.002044	6.6	7.38
28	Pine Cree	10.17	10-year	8500	771.66	2.3	0.024	1775.69	6.93	0.002001	3.99	5.22
29												
30	Pine Cree	10	100-year	30000	2187.11	3.02	0.031	6594.84	9.57	0.002001	6.63	7.33
31	Pine Cree	10	10-year	8500	771.15	2.3	0.024	1774.66	6.93	0.002004	3.98	5.22

5.8 Click the **“Save As...”** option under the **“File”** menu.



Give the file a descriptive name (say, “*RAS Results*”) and save the file in the **Microsoft Excel 5.0/95 Workbook** format.

6.0 IMPORT THE HEC-RAS DATA INTO DDMSW.

- 6.1 Launch the DDMSW program and open the **SELECT PROJECT** form (‘**File** ➔ **Select Project**’). Select the ‘**BANKPROTECTIONFCD**’ Project and click ‘**OK**’ close the form.

Select Project

Look for

Reference	Date	ID	Title
BANKPROTECTIONFCD	10/09/2015	00033	River Mechanics Example - Bank Protection
BRIDGEPIERFCD	01/01/2010	00034	River Mechanics Example - Bridge Pier
DASHDSKADA	06/22/2015	00059	
EFSFSF	07/21/2015	00064	
EMF_HYDROLOGY	/ /	00061	Hydrologic Analysis for East Maricopa Floodway - FCD 2012C
EMF_HYDROLOGYCCC	07/06/2015	00062	Hydrologic Analysis for East Maricopa Floodway - FCD 2012C
EXAMPLE1	10/07/2015	00035	Clark, Green Ampt, Single, 6 Hour
EXAMPLE2	01/01/2010	00036	S-Graph, Green-Ampt, Single, 24 Hour
EXAMPLE3	01/01/2010	00037	S-Graph, Green-Ampt, Multiple, 6 Hour
EXAMPLE4	01/01/2010	00038	Clark, Init and Uniform, Single, 6 Hour
KVLEXAMPLE1	09/25/2015	00039	Example 1 HEC-1 tutorial project
KVLEXAMPLE10	01/10/2014	00040	HEC-1 Tutorial - Import HEC-1 File
KVLEXAMPLE11	01/10/2014	00041	FCDMC Hydraulics Manual Design Example 4.6
KVLEXAMPLE12	01/10/2014	00042	Street Drainage Example
KVLEXAMPLE12_OLD	01/10/2014	00066	Street Drainage Example
KVLEXAMPLE2	01/01/2011	00043	Example 2 using Shape files and NOAA 14

Modification Date: 10/09/2015

Print... Delete Add OK

- 6.2 Open the **RIVER MECHANICS – CROSS SECTION HYDRAULICS** form (**'River Mechanics → Cross Section Hydraulics'**). Press the **'Add'** button to add additional data. Enter **'RASCROSSECTION'** in the **Section ID** textbox field. On the **"Source"** drop down list, select **'HEC-RAS'** and check the **"Total Scour"** checkbox. Press **"Save"** to save the data entered.

River Mechanics - Cross Section Hydraulics -- Add

Section ID

Cross Section ID
 RASCROSSECTION
 STUDYREACHCROSSSECTION
 SUPPLYREACHCROSSSECTION

Entire Cross Section
 Source: **HEC-RAS**
☒ **Total Scour**
☒ **Design** ☒ **Dominant**

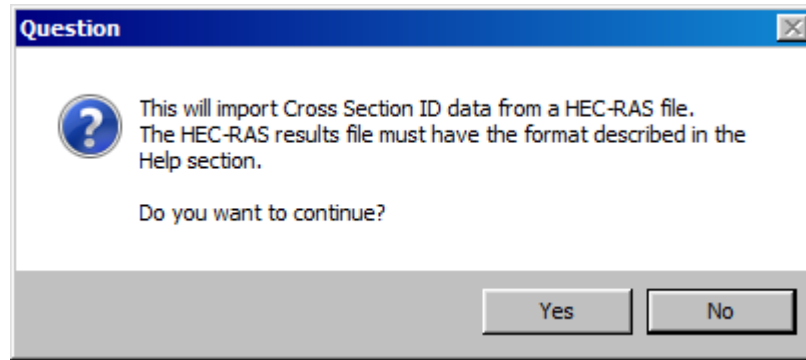
Flow Rate (cfs)		
Slope (ft/ft)		
Manning's n Channel		Man's n
Manning's n LOB		
Manning's n ROB		
Flow Area (sq ft)		
Wetted Perimeter (ft)		
Average Width (ft)		
Top Width (ft)		
Hydraulic Depth (ft)		
Normal or Max Depth (ft)		
Velocity (ft/sec)		

Main Channel (Bedform Scour)

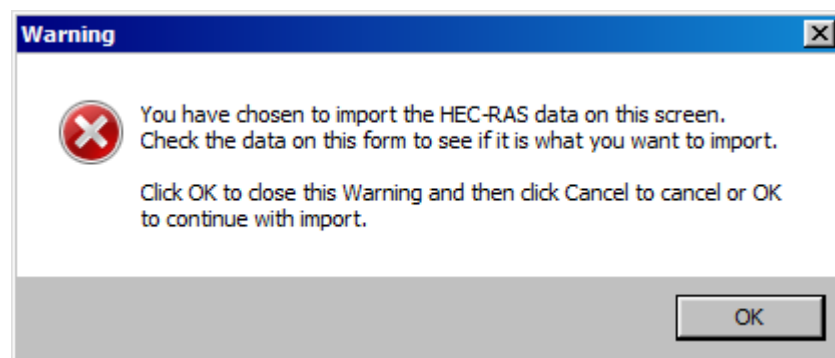
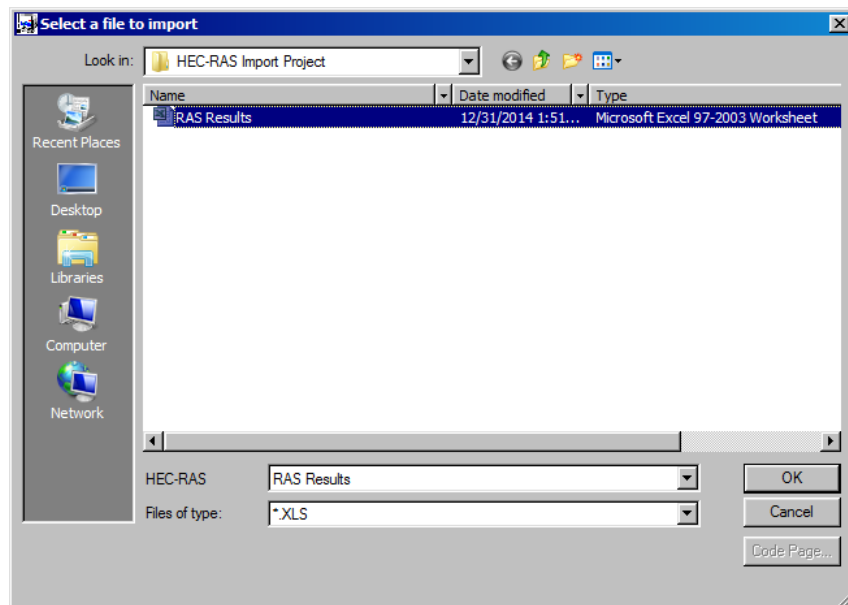
Hydraulic Depth (ft)		
Velocity (ft/sec)		
Froude Number		

Save Cancel Print... Copy Delete Add Graph X Section Detail Update OK

- 6.3 Press the '**HEC-RAS**' button at the bottom left of the form to import the "**RAS Results.xls**". Click '**Yes**' to continue.



- 6.4 Select the Data File to Import. On the **SELECT A FILE TO IMPORT** form, go to the folder where the '*RAS Results.xls*' was saved earlier and select the file. Click '**OK**' to continue. Click '**OK**' when a **WARNING** windows shows up to continue.



- 6.5 Select the Design and Dominant Profiles. On the **IMPORT HEC-RAS DATA** form, click the magnifying glass on the right side of the **Design** textbox field and select '*100-year*'. For the **Dominant Profile**, select '*10-year*'.

Reach	Sta	Profile	Q Total	Filename
Pine Cree	10.9	100-year	30000	RAS RESULTS
Pine Cree	10.9	10-year	8500	RAS RESULTS
Pine Cree	10.71	100-year	30000	RAS RESULTS
Pine Cree	10.71	10-year	8500	RAS RESULTS
Pine Cree	10.55	100-year	30000	RAS RESULTS
Pine Cree	10.55	10-year	8500	RAS RESULTS
Pine Cree	10.48	100-year	30000	RAS RESULTS
Pine Cree	10.48	10-year	8500	RAS RESULTS
Pine Cree	10.37	100-year	30000	RAS RESULTS
Pine Cree	10.37	10-year	8500	RAS RESULTS
Pine Cree	10.35	100-year	30000	RAS RESULTS
Pine Cree	10.35	10-year	8500	RAS RESULTS
Pine Cree	10.23	100-year	30000	RAS RESULTS
Pine Cree	10.23	10-year	8500	RAS RESULTS
Pine Cree	10.17	100-year	30000	RAS RESULTS
Pine Cree	10.17	10-year	8500	RAS RESULTS
Pine Cree	10	100-year	30000	RAS RESULTS

Select Profiles

Design 100-year

Dominant 10-year

Press **'OK'** to proceed and click **'Yes'** to import the data.

Question

You have selected to import Design and Dominant profile data!
Do you want to proceed?

The **RIVER MECHANICS – CROSS SECTION HYDRAULICS** form provided below shows the results of the successful import. The user can now select from the list of cross section IDs to use for his or her River Mechanics analysis. Click **'OK'** to close the form.

River Mechanics - Cross Section Hydraulics

Section ID: **RAS RESULTS-10**

Cross Section ID: **RAS RESULTS-10**

HEC-RAS Plan: Existing River:
RIVER-1 Reach: Reach-1 Sta: 10

Entire Cross Section

Source: **HEC-RAS** ☒ Design ☒ Dominant

Flow Rate (cfs)	30000	8500
Slope (ft/ft)	0.002001	0.002004
Manning's n Channel	0.031	0.024
Manning's n LOB		
Manning's n ROB		
Wetted Area (sq ft)	6594.84	1774.66
Wetted Perimeter (ft)	2187.11	771.15
Average Width (ft)	689.12	256.08
Top Width (ft)	2183.72	771.59
Hydraulic Depth (ft)	3.02	2.30
Normal or Max Depth (ft)	9.57	6.93
Velocity (ft/sec)	4.55	4.79

Main Channel (Bedform Scour)

Hydraulic Depth (ft)	6.63	3.98
Velocity (ft/sec)	7.33	5.22
Froude Number	0.50	0.46

HEC-RAS Info Print... Copy Delete Add Graph X Section Detail Update OK

This ends this tutorial.