



DRAINAGE DESIGN MANAGEMENT SYSTEM FOR WINDOWS VERSION 6.0.5

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: APRIL 20, 2022

TUTORIAL TIME: 40 MINUTES

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.

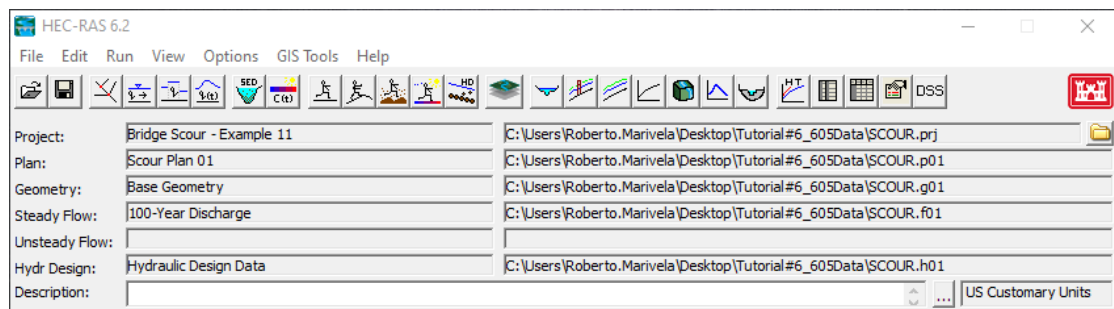
The content of this tutorial document was tested and updated using **HEC-RAS 6.2** and **DDMSW 6.0.5**.

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.

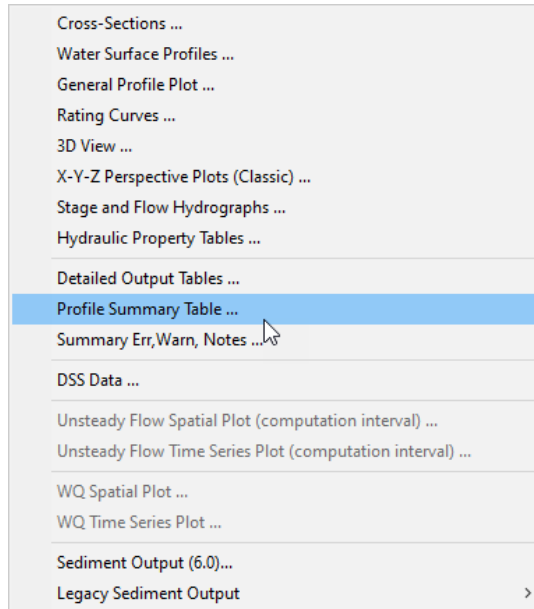
3.0 OPEN A HEC-RAS PROJECT

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 ...**).

A screenshot of the 'Profile Output Table - Standard Table 1' form. The 'Options' menu is open, showing options like 'Plans ...', 'Profiles ...', 'Reaches ...', 'Include Interpolated XS's', 'Include Node Names in Table', 'Include Profile Name in Table', 'Table Cross Section Order ...', 'Standard Table # Dec Places', 'Units System for Viewing', 'Define Table ...' (highlighted), 'Save Table ...', and 'Remove Table ...'. The background shows a table with columns: 'W.S. Elev (ft)', 'Crit W.S. (ft)', 'E.G. Elev (ft)', 'E.G. Slope (ft/ft)', 'Vel Chnl (ft/s)', 'Flow Area (sq ft)', 'Top Width (ft)', and 'Froude # Chl'. The table data includes values for 'Pine' and 'Reach: Pine Creek'.

W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
19.71		20.25	0.001875	7.11	6878.14	2282.54	0.49
17.04		17.45	0.001993	5.21	1786.84	791.81	0.46
18.02		18.45	0.001453	6.46	7585.25	2297.98	0.43
15.04		15.45	0.001989	5.21	1788.77	792.79	0.46
17.27		17.52	0.000774	5.09	9563.46	2340.63	0.32
13.47		13.88	0.001936	5.16	1812.00	811.75	0.45
17.02		17.21	0.000557	4.50	10749.31	2365.82	0.27
12.75		13.14	0.001875	5.11	1841.91	850.14	0.45
15.22	13.04	16.14	0.002005	8.10	4187.48	2340.08	0.51
11.56	9.68	11.94	0.001799	4.99	1808.24	809.66	0.44

- 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

◀ ▶

Delete Column Insert Column **Clear All Table Headings**

Available Variables Filter:

# 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.
BR Sluice Coef	Bridge Sluice Flow Coefficient.
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 SPD	Right side slope of weir breach.

OK Cancel

- 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

Q Lat RC	Lateral rating curve flow.
Q Leaving Total	Total flow leaving in a lateral structure including all gates, culverts and lat
Q Left	Flow in left overbank.
Q Opening Ch	Flow through the opening in the channel.
Q Opening L	Flow through the bridge opening in the left overbank.
Q Opening R	Flow through the bridge opening in the right overbank.
Q Outlet TS	Inline/Lateral Outlet time series flow.
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.
W.S. Elev	Calculated water surface from energy equation.

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				

Delete Column Insert Column Clear All Table Headings

Available Variables Filter: q

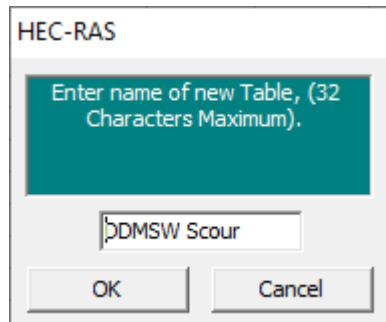
Q Lat RC	Lateral rating curve flow.
Q Leaving Total	Total flow leaving in a lateral structure including all gates, culverts and lat
Q Left	Flow in left overbank.
Q Opening Ch	Flow through the opening in the channel.
Q Opening L	Flow through the bridge opening in the left overbank.
Q Opening R	Flow through the bridge opening in the right overbank.
Q Outlet TS	Inline/Lateral Outlet time series flow.
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.
W.S. Elev	Calculated water surface from energy equation.

OK Cancel

- 4.6 Repeat Steps 4.4 and 4.5 for the following variables: “E.G. Slope”, “Mann Wtd Chnl”, “Mann Wtd Left”, “Mann Wtd Rght”, “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.

- 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

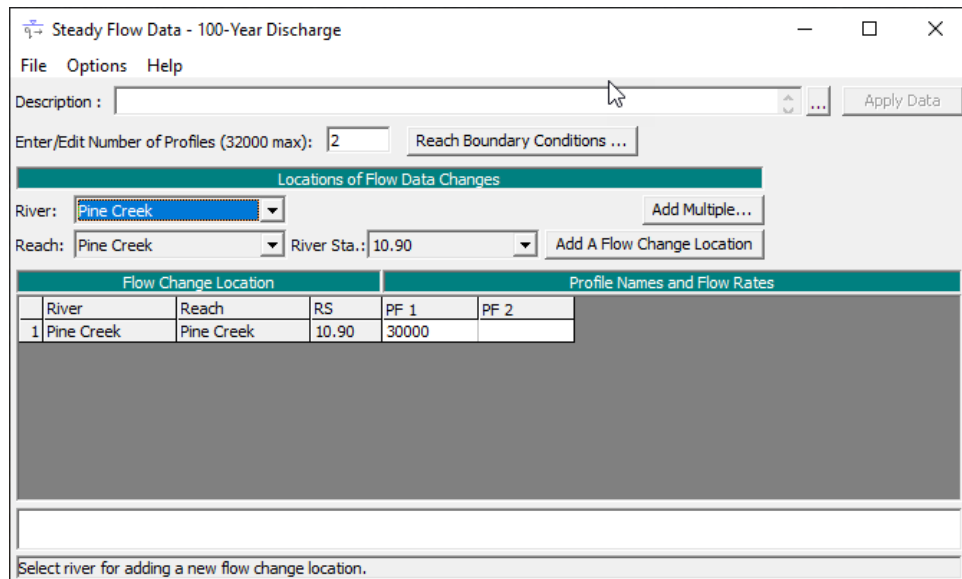
✓ DDMSW Scour -RAS Plan: ScourPlan01 River: Pine Creek Reach: Pine Creek Reload Data

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	Vel Chnl (ft/s)	Froude # Chl
Pine Creek	10.90	100-year	30000.00	0.001875	0.032	0.042	0.042	6878.14	2282.81	2282.54	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	0.001453	0.032	0.042	0.042	7585.25	2298.26	2297.98	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	1788.77	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	9563.46	2340.94	2340.63	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	1812.00	811.95	811.75	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	10749.31	2366.15	2365.82	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	1841.91	850.34	850.14	2.17	7.00	4.61	4.05	5.11	0.45
Pine Creek	10.37	100-year	30000.00	0.002005	0.032	0.042		4187.48	650.20	2340.08	6.44	10.75	7.16	7.70	8.10	0.51
Pine Creek	10.37	10-year	8500.00	0.001799	0.032	0.042		1808.24	650.20	809.66	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		3603.83	625.19	2302.10	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	5886.70	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	769.61	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	6540.86	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	0.002002	0.032	0.042	0.042	6594.21	2187.09	2186.83	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

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.

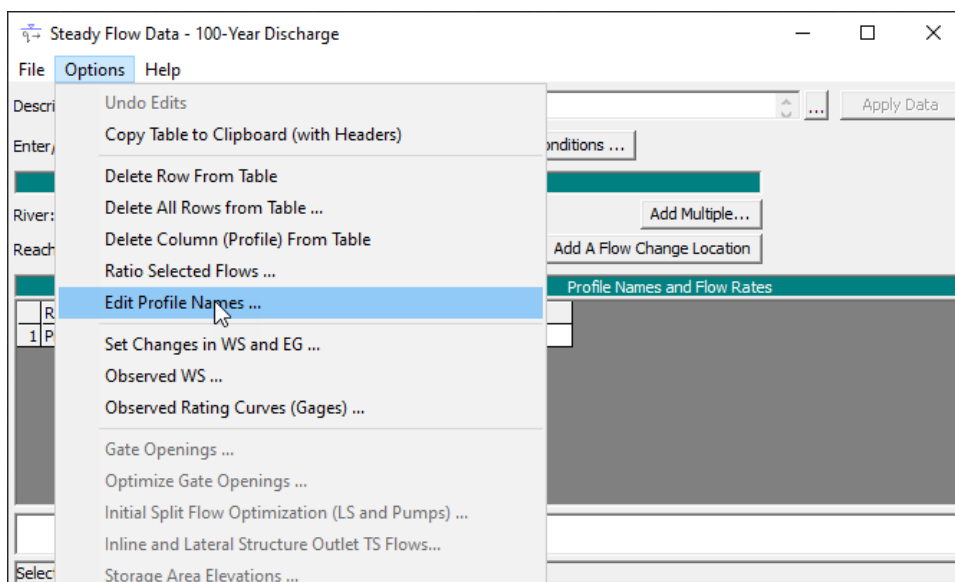
- 5.1 Two profiles in the HEC-RAS model must be specified. One profile for the design discharge (usually the 100-year flow rate), and the bankfull discharge (usually taken as the 10-year flow rate). This can be done by entering “2” in the “**Enter/Edit Number of Profiles (25000 max):**” textbox field 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.



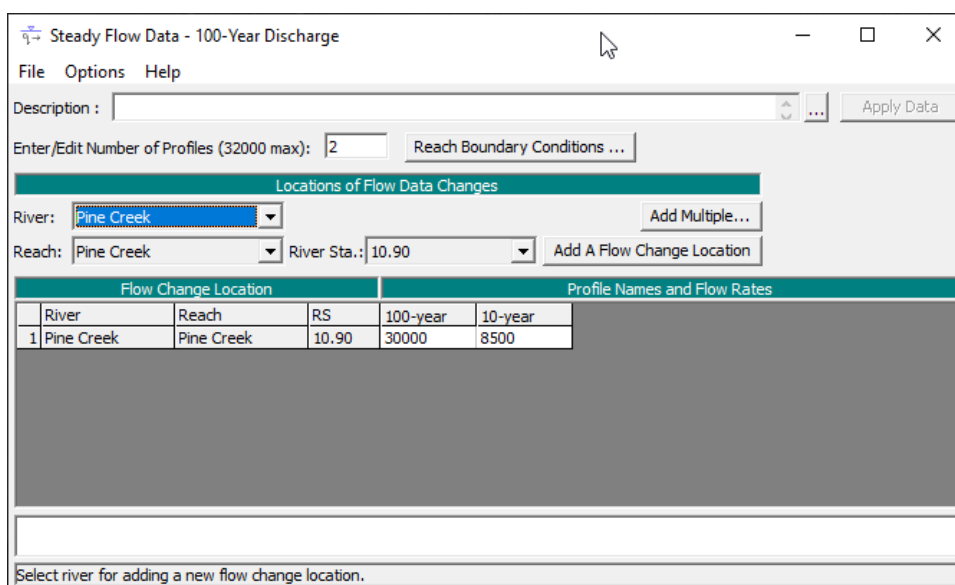
The screenshot shows the 'Steady Flow Data - 100-Year Discharge' dialog box. The 'Enter/Edit Number of Profiles (32000 max):' field is set to 2. The 'Locations of Flow Data Changes' section shows 'Pine Creek' as the River and 'Pine Creek' as the Reach, with 'River Sta.: 10.90'. A table below lists the flow change location and profile names/flow rates.

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

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



- 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.



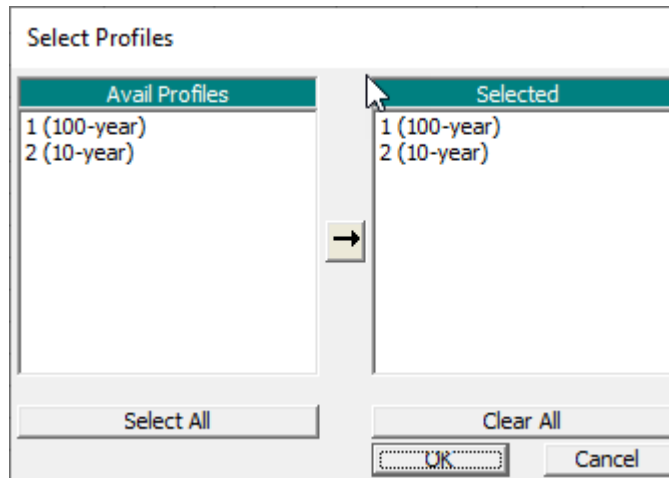
- 5.3 On the main menu of HEC-RAS, open the **PROFILE OUTPUT TABLE** form ('**View → Profile Summary Table ...**') to access the "**DDMSW Scour**" template ('**User Tables → DDMSW Scour**'). If the "**DDMSW Scour**" table is not the active table (i.e., not checked), please repeat Step 4.9.

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	6878.14	2282.81	2282.54	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	0.001453	0.032	0.042	0.042	7585.25	2298.26	2297.98	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	1788.77	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	9563.46	2340.94	2340.63	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	1812.00	811.95	811.75	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	10749.31	2366.15	2365.82	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	1841.91	850.34	850.14	2.17	7.00	4.61	4.05	5.11	0.45
Pine Creek	10.37	100-year	30000.00	0.002005	0.032	0.042		4187.48	650.20	2340.08	6.44	10.75	7.16	7.70	8.10	0.51
Pine Creek	10.37	10-year	8500.00	0.001799	0.032	0.042		1808.24	650.20	809.66	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		3603.83	625.19	2302.10	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	5886.70	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	769.61	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	6540.86	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	0.002002	0.032	0.042	0.042	6594.21	2187.09	2186.83	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																
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	6878.14	2282.81	2282.54	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	0.001453	0.032	0.042	0.042	7585.25	2298.26	2297.98	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	1788.77	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	9563.46	2340.94	2340.63	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	1812.00	811.95	811.75	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	10749.31	2366.15	2365.82	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	1841.91	850.34	850.14	2.17	7.00	4.61	4.05	5.11	0.45
Pine Creek	10.37	100-year	30000.00	0.002005	0.032	0.042		4187.48	650.20	2340.08	6.44	10.75	7.16	7.70	8.10	0.51
Pine Creek	10.37	10-year	8500.00	0.001799	0.032	0.042		1808.24	650.20	809.66	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		3603.83	625.19	2302.10	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	5886.70	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	769.61	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	6540.86	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	0.002002	0.032	0.042	0.042	6594.21	2187.09	2186.83	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.																

- 5.5 Go to the **“Options”** menu and select the **“Profiles ...”** option. This brings up the **SELECT PROFILES** form from which Profiles can be selected for HEC-RAS to display. Make sure that both the Design profile (shown as 100-year) and the Bank full profile (shown as 10-year) are shown in the **“Selected”** column.



Press **‘OK’** to close the **SELECT PROFILES** form. The Table should now look similar to the following table.

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	100-year	30000.00	0.001875	0.032	0.042	0.042	6878.14	2282.81	2282.54	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	0.001453	0.032	0.042	0.042	7585.25	2298.26	2297.98	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	1788.77	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	9563.46	2340.94	2340.63	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	1812.00	811.95	811.75	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	10749.31	2366.15	2365.82	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	1841.91	850.34	850.14	2.17	7.00	4.61	4.05	5.11	0.45
Pine Creek	10.37	100-year	30000.00	0.002005	0.032	0.042		4187.48	650.20	2340.08	6.44	10.75	7.16	7.70	8.10	0.51
Pine Creek	10.37	10-year	8500.00	0.001799	0.032	0.042		1808.24	650.20	809.66	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		3603.83	625.19	2302.10	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	5886.70	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	769.61	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	6540.86	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	0.002002	0.032	0.042	0.042	6594.21	2187.09	2186.83	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

Top width of the wetted 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

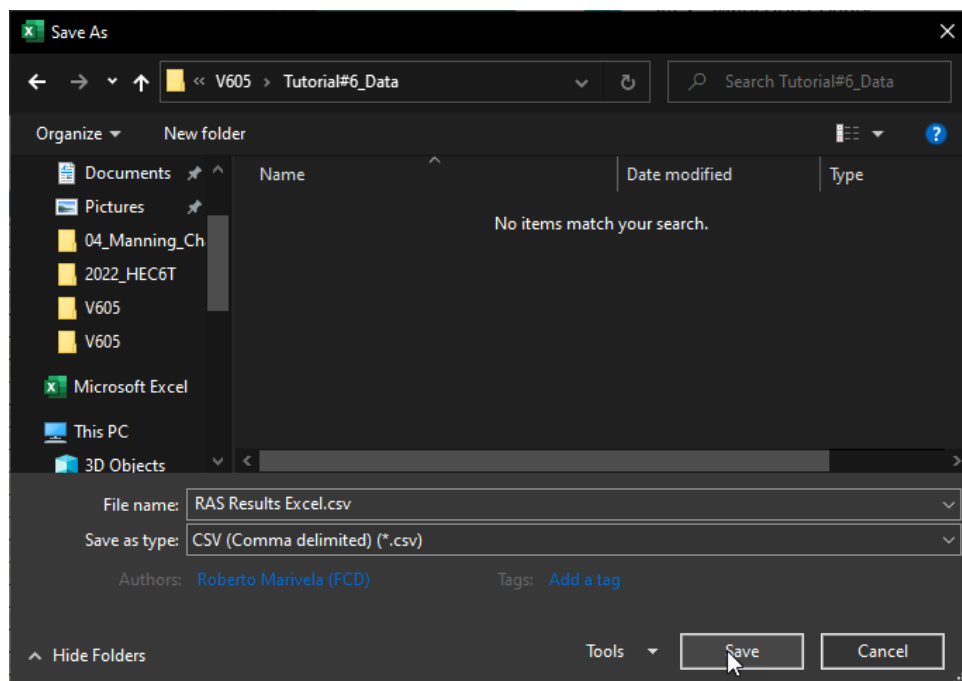
Reach	River Sta	Profile	Q Total (cfs)	E.G. Slope (ft/ft)	Mann Wtd Chl	Mann Wtd Left	Mann Wtd Right	Flow Area (sq ft)	W.P. Total (ft)	Top Width (ft)	Hydr Depth (ft)	Max Chl Dpth (ft)	Vel Total (ft/s)	Hydr Depth C (ft)	Vel Chl (ft/s)	Froude # Chl
Pine Creek	10.90	100-year	30000.00	0.001875	0.032	0.042	0.042	6878.14	2282.81	2282.54	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	0.001453	0.032	0.042	0.042	7585.25	2298.26	2297.98	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	1788.77	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	9563.46	2340.94	2340.63	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	1812.00	811.95	811.75	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	10749.31	2366.15	2365.82	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	1841.91	850.34	850.14	2.17	7.00	4.61	4.05	5.11	0.45
Pine Creek	10.37	100-year	30000.00	0.002005	0.032	0.042	0.042	4187.48	650.20	2340.08	6.44	10.75	7.16	7.70	8.10	0.51
Pine Creek	10.37	10-year	8500.00	0.001799	0.032	0.042	0.042	1808.24	650.20	809.66	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	0.042	3603.83	625.19	2302.10	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	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	5886.70	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	769.61	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	6540.86	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	0.002002	0.032	0.042	0.042	6594.21	2187.09	2186.83	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.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	Reach	River Sta	Profile	Q Total	E.G. Slope	Mann Wtc	Mann Wtc	Mann Wtc	Flow Area	W.P. Total	Top Width	Hydr Dept	Max Chl D	Vel Total	H
				(cfs)	(ft/ft)				(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft/s)	(ft)
2				30000	0.001875	0.032	0.042	0.042	6878.14	2282.81	2282.54	3.01	9.6	4.36	
4	Pine Cree	10.9	100-year	8500	0.001993	0.032	0.042	0.042	1786.84	792.01	791.81	2.26	6.93	4.76	
6	Pine Cree	10.71	100-year	30000	0.001453	0.032	0.042	0.042	7585.25	2298.26	2297.98	3.3	9.91	3.96	
7	Pine Cree	10.71	10-year	8500	0.001989	0.032	0.042	0.042	1788.77	792.99	792.79	2.26	6.93	4.75	
9	Pine Cree	10.55	100-year	30000	0.000774	0.032	0.042	0.042	9563.46	2340.94	2340.63	4.09	10.76	3.14	
10	Pine Cree	10.55	10-year	8500	0.001936	0.032	0.042	0.042	1812	811.95	811.75	2.23	6.96	4.69	
12	Pine Cree	10.48	100-year	30000	0.000557	0.032	0.042	0.042	10749.31	2366.15	2365.82	4.54	11.27	2.79	
13	Pine Cree	10.48	10-year	8500	0.001875	0.032	0.042	0.042	1841.91	850.34	850.14	2.17	7	4.61	
15	Pine Cree	10.37	100-year	30000	0.002005	0.032	0.042		4187.48	650.2	2340.08	6.44	10.75	7.16	
16	Pine Cree	10.37	10-year	8500	0.001799	0.032	0.042		1808.24	650.2	809.66	2.78	7.09	4.7	
18	Pine Cree	10.36		Bridge											
20	Pine Cree	10.35	100-year	30000	0.00303	0.032	0.042		3603.83	625.19	2302.1	5.77	9.99	8.32	
21	Pine Cree	10.35	10-year	8500	0.00202	0.032	0.042		1696.92	598.12	795.85	2.84	6.94	5.01	
23	Pine Cree	10.23	100-year	30000	0.002154	0.032	0.042	0.042	5886.7	1700.2	2188.36	3.46	9.6	5.1	
24	Pine Cree	10.23	10-year	8500	0.002011	0.032	0.042	0.042	1771.55	769.61	769.42	2.3	6.92	4.8	
26	Pine Cree	10.17	100-year	30000	0.002044	0.032	0.042	0.042	6540.86	2185.93	2185.67	2.99	9.54	4.59	
27	Pine Cree	10.17	10-year	8500	0.002001	0.032	0.042	0.042	1775.69	771.66	771.46	2.3	6.93	4.79	
29	Pine Cree	10	100-year	30000	0.002002	0.032	0.042	0.042	6594.21	2187.09	2186.83	3.02	9.57	4.55	
30	Pine Cree	10	10-year	8500	0.002004	0.032	0.042	0.042	1774.66	771.15	770.95	2.3	6.93	4.79	

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 **CSV (Comma delimited)(*.csv)** 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

Group: River Mechanics

Project Group	ID	Reference	Title
River Mechanics	00058	ABUTMENT_NCHRP2	Abutment Scour using HEC-18 NCHRP Procedure
River Mechanics	00085	BANKPROTECTIONFCD	River Mechanics Example - Bank Protection
River Mechanics	00086	BRIDGEPIERFCD	River Mechanics Example - Bridge Pier
River Mechanics	00056	GUIDEBANK_NCHRP	Guide Bank Scour using HEC-18 NCHRP Procedure
River Mechanics	00055	GUIDEBANK_NCHRP2	Guide Bank Scour using HEC-18 NCHRP Procedure
River Mechanics	00102	LATEROSIONEXAMPLE	Lateral Erosion Example
River Mechanics	00103	LAUNCHABLERIPRAP	River Mechanics Example - Launchable RipRap
River Mechanics	00054	PIER_INFLUENCE	Pier Influence Zone calculation using HEC-18 Procedure
River Mechanics	00053	PRESSURE_SCOUR	Pressure Flow Scour using HEC-18 Procedure
River Mechanics	00104	PROJECTXSECTIONS	River Mechanics Cross Sections
River Mechanics	00105	RIPRAPSTIZINGFCD	River Mechanics Example - Riprap Sizing
River Mechanics	00081	SCOURTUTORIAL	River Mechanics Example
River Mechanics	00106	SEDIMENTYIELDFCD	River Mechanics Example - Sediment Yield
Street Drainage	00094	KVLEXAMPLE12	Street Drainage Example
Street Drainage	00100	KVLEXAMPLE8	Street Drainage Examples

Modification Date: 01/01/2012

Buttons: Update Project Defaults, Info, 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 **'RASCROSSSECTION'** 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.

The screenshot shows the 'River Mechanics - Cross Section Hydraulics -- Add' window. The 'Section ID' field is set to 'RASCROSSSECTION'. The 'Entire Cross Section' section has a 'Source' dropdown set to 'HEC-RAS' and a 'Total Scour' checkbox checked. The 'Main Channel (Bedform Scour)' section is also visible. The 'Save' button is highlighted with a red box.

Parameter	Value
Flow Rate (cfs)	
Slope (ft/ft)	
Manning's n Channel	
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)	
Total Cross Section Velocity (ft/sec)	

Parameter	Value
Hydraulic Depth (ft)	
Main Channel Velocity (ft/sec)	
Froude Number	

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

River Mechanics - Cross Section Hydraulics

Section ID: RASCROSSSECTION

Cross Section ID: RASCROSSSECTION, STUDYREACHCROSSSECTION, SUPPLYREACHCROSSSECTION

Entire Cross Section

Source: HEC-RAS

Design: ☒ Dominant: ☒

Total Scour: ☒

Flow Rate (cfs): [Yellow Box]

Slope (ft/ft): [Yellow Box]

Manning's n Channel: [Yellow Box] Man's n

Manning's n LOB: [Yellow Box]

Manning's n ROB: [Yellow Box]

Flow Area (sq ft): [Yellow Box]

Wetted Perimeter (ft): [Yellow Box]

Average Width (ft): [Yellow Box]

Top Width (ft): [Yellow Box]

Hydraulic Depth (ft): [Yellow Box]

Normal or Max Depth (ft): [Yellow Box]

Total Cross Section Velocity (ft/sec): [Yellow Box]

Main Channel (Bedform Scour)

Hydraulic Depth (ft): [Yellow Box]

Main Channel Velocity (ft/sec): [Yellow Box]

Froude Number: [Yellow Box]

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

Question

?

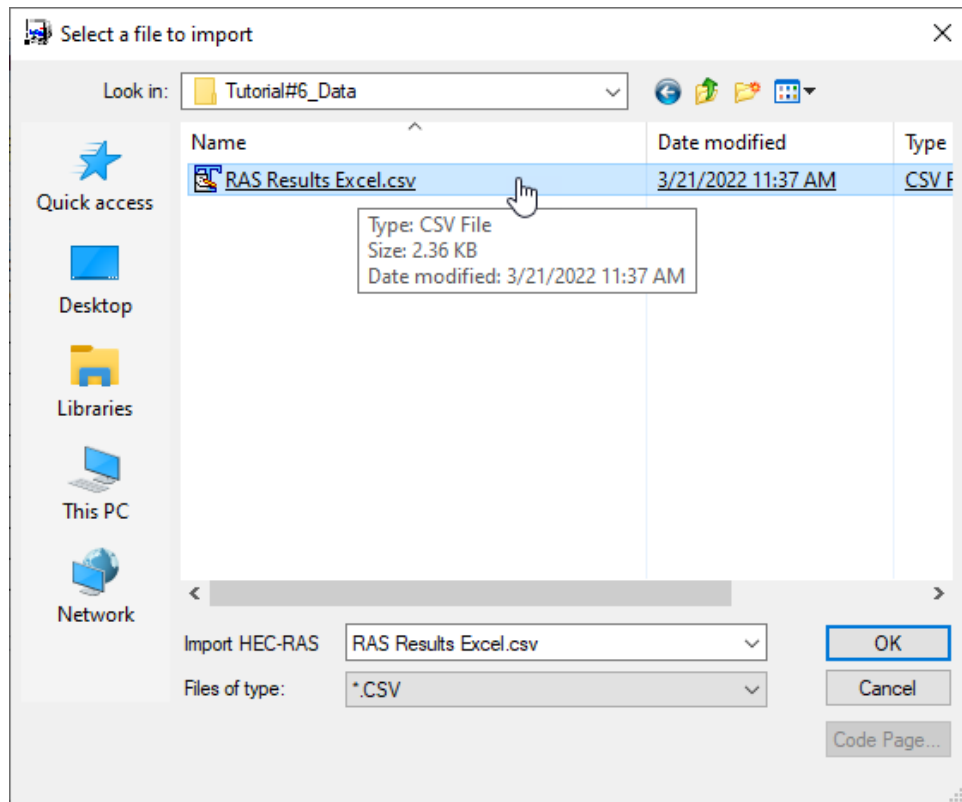
This will import Cross Section ID data from a HEC-RAS results file.

The HEC-RAS results file must be a CSV file and have the format described in the Help section.

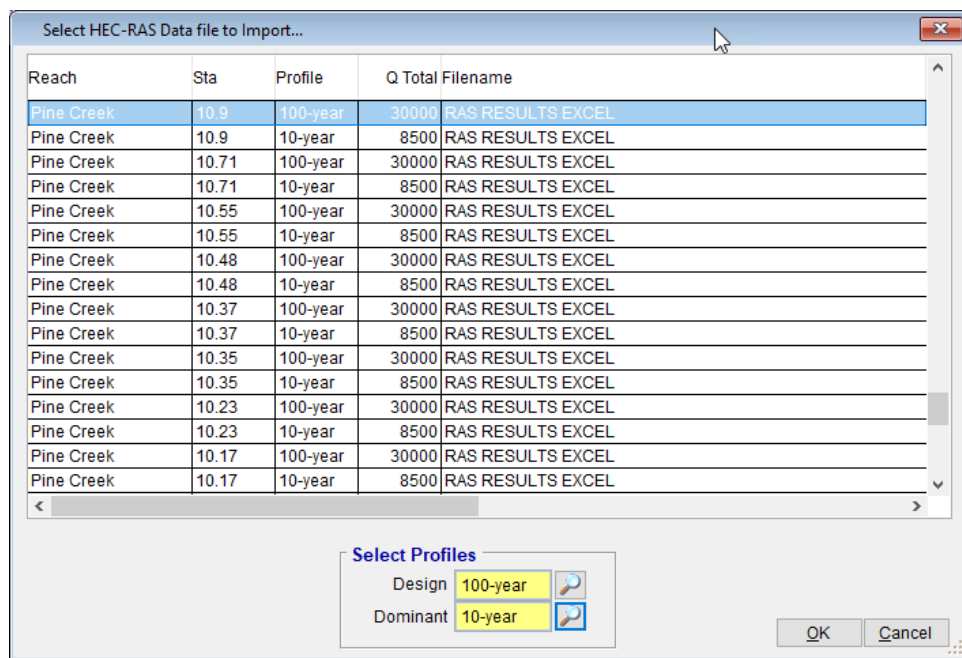
Do you want to continue?

Yes No

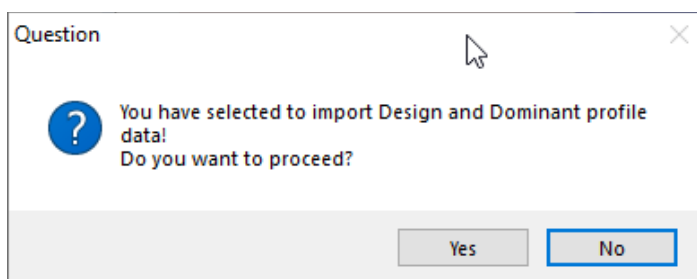
- 6.4 Select the Data File to Import. On the **SELECT A FILE TO IMPORT** form, go to the folder where the '**RAS Results Excel.csv**' file was saved earlier and select the file. Click '**OK**' to continue. Click '**OK**' if a **WARNING** windows shows up to continue.



- 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'.



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



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.

The screenshot shows the 'River Mechanics - Cross Section Hydraulics' window. On the left, there's a list of 'Cross Section ID' with 'RAS RESULTS EXCEL-10' selected. Below it, a 'Sta: 10' field is visible. The main area is titled 'Entire Cross Section' and contains a table of hydraulic data for two profiles: 'Design' and 'Dominant'. The 'Source' is set to 'HEC-RAS'. Checkboxes for 'Design' and 'Dominant' are checked. A 'Total Scour' checkbox is also checked. The table lists various parameters like Flow Rate, Slope, Manning's n, Flow Area, Wetted Perimeter, Average Width, Top Width, Hydraulic Depth, Normal or Max Depth, and Total Cross Section Velocity. Below this, a section for 'Main Channel (Bedform Scour)' shows Hydraulic Depth, Main Channel Velocity, and Froude Number. At the bottom, there's a toolbar with buttons: HEC-RAS, Info, Print..., Copy, Delete, Add, Graph, Section, Detail, Update, and OK.

Parameter	Design	Dominant
Flow Rate (cfs)	30000	8500
Slope (ft/ft)	0.002002	0.002004
Manning's n Channel	0.032	0.032
Manning's n LOB	0.042	0.042
Manning's n ROB	0.042	0.042
Flow Area (sq ft)	6594.21	1774.66
Wetted Perimeter (ft)	2187.09	771.15
Average Width (ft)	689.05	256.08
Top Width (ft)	2186.83	770.95
Hydraulic Depth (ft)	3.02	2.30
Normal or Max Depth (ft)	9.57	6.93
Total Cross Section Velocity (ft/sec)	4.55	4.79

Parameter	Design	Dominant
Hydraulic Depth (ft)	6.63	3.98
Main Channel Velocity (ft/sec)	7.33	5.22
Froude Number	0.50	0.46

This ends this tutorial.