# 10.4 Reach Editor

1. Click on this button to view or modify stream reach settings and associated parameters through the "Reach Editor" window (Screen 10.4.1). This window contains five options— *Add/Remove Reaches, Setup Reach Network, Reach Network Visualization, Reach Characteristics,* and *F-Tables*.

2. Select **Add/Remove Reaches** to view the reaches associated with the watershed(s) selected for
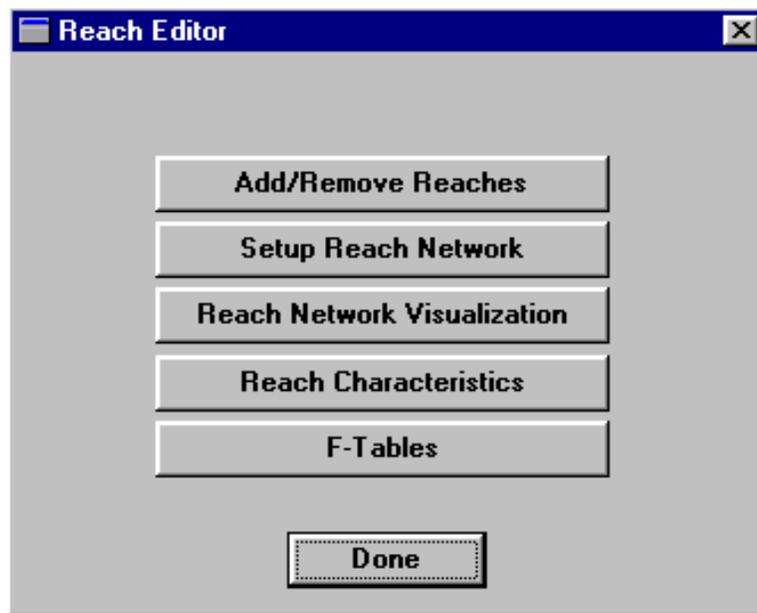
Screen 10.4.1

simulation. This window (Screen 10.4.2) displays Reach #, Reach Name, Reach ID, # of Exits, Type (Stream or Lake), and Watershed for each reach.

Be sure that all reaches are designated as Streams because NPSM currently does not simulate lakes.

Be sure that designations in other portions reflect any changes made to existing reaches in this window.
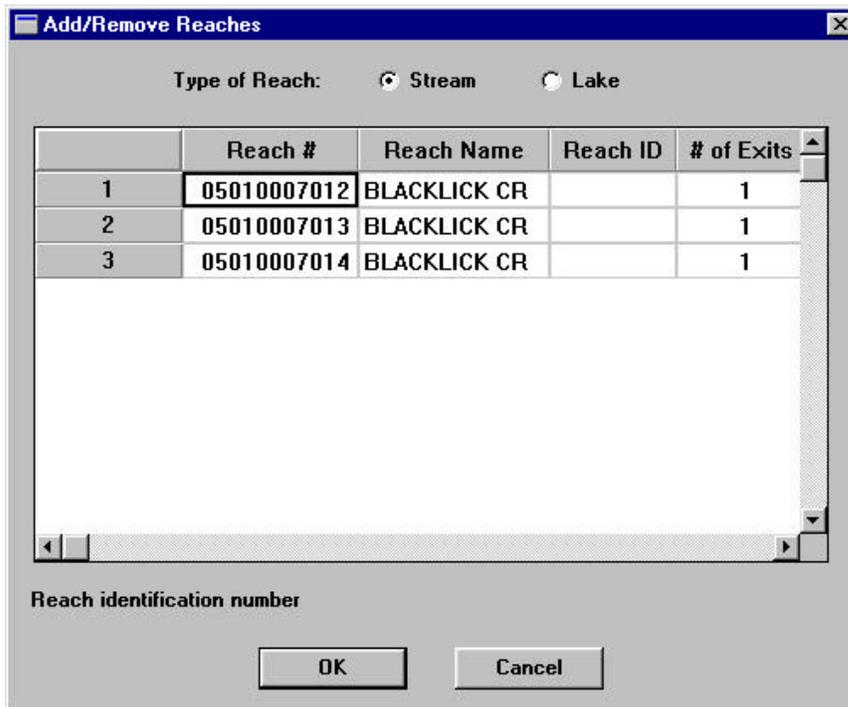
The # of Exits should be set to 1, because multiple exits are not currently supported in NPSM.
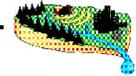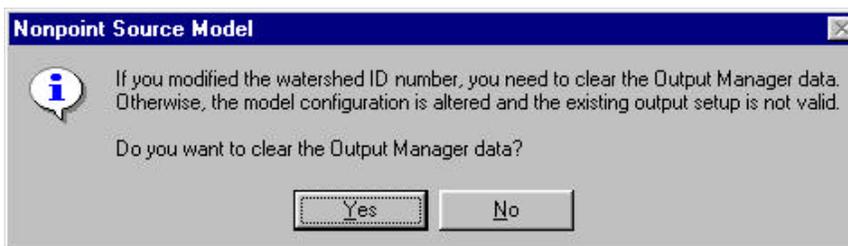
Click **OK** to save any changes and leave this window or **Cancel** to leave the window without saving changes. If you select **OK**, you will be prompted to clear the Output Manager data (screen 10.4.3). Select **Yes** if you have modified the watershed ID number or **No** if you have not.

Add/Remove Reaches

Type of Reach: ● Stream   ○ Lake

	Reach #	Reach Name	Reach ID	# of Exits
1	05010007012	BLACKLICK CR		1
2	05010007013	BLACKLICK CR		1
3	05010007014	BLACKLICK CR		1

Reach identification number

OK   Cancel

Screen 10.4.2

Nonpoint Source Model

ℹ If you modified the watershed ID number, you need to clear the Output Manager data. Otherwise, the model configuration is altered and the existing output setup is not valid.

Do you want to clear the Output Manager data?

Yes   No

Screen 10.4.3

3. Select **Setup Reach Network** to view the reach network in a text format. This window (Screen 10.4.4) displays the Reach #, Reach Name, Headwater, Upstream Left, Upstream Right, Complementary, and Downstream reach for each reach being simulated. This network is set up automatically based on the characteristics derived from the information in the BASINS Reach File, Version 1 and Reach File, Version 3 files.

    Each reach appearing in the "Add/Remove Reaches" window should also be present in this window. Any reach that is a headwater should be designated with a "Yes" in the Headwater column. If you need to change the headwater designation, click on the cell you wish to change and click on one of the two radio buttons at the top of the window (**Yes** and **No**).

    The Upstream Left, Upstream Right, Complementary (reach feeding into the most downstream end of the reach in question), and Downstream columns contain the appropriate reach numbers of the surrounding reaches. A value of -999999 for any of these categories (which is acceptable in many situations) signifies that no surrounding reach matches this identification. Headwater reaches should always have values of -999999 for the Upstream Left and Upstream Right categories.

    Click **OK** to save any changes and leave this window or **Cancel** to leave the window without saving changes.

4. Select the **Reach Network Visualization** button to view the reach network graphically. The "Reach Graph" window (Screen 10.4.5) displays information from the "Setup Reach Network" screen in a

Reach Network Editor

Headwater Reach: ○ Yes ● No

	Reach #	Reach Name	Headwater	Upstream
1	05010007012	BLACKLICK CR	No	0501000?
2	05010007013	BLACKLICK CR	Yes	-999999
3	05010007014	BLACKLICK CR	Yes	-999999

Reach identification number

OK   Cancel

Screen 10.4.4

graphical manner. It also allows you to add, remove, and move reaches in a visual manner.

Each blue line segment represents a separate reach. Moving the cursor onto a segment changes the segment color to green and displays a box containing reach identification information. The identification information includes Reach name, Reach #, Watershed ID, Reach ID, ULCSM (upstream left), URCSM (upstream right), DSCSM (downstream), and CCSM (complementary).
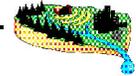
When the watershed delineation is based on Reach File, Version 3 streams IDs are automatically assigned by BASINS. In the visualization screen the assigned ID and the original reach ID are displayed.

Click **OK** or **Cancel** to exit this screen.
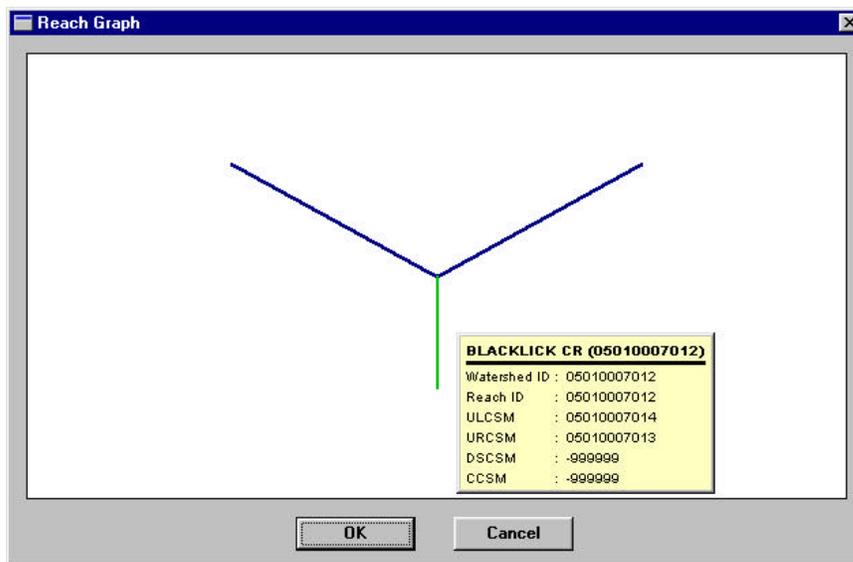
Screen 10.4.5

Tip: *To add, remove, or move a reach segment, highlight the segment and click on the right mouse button. A list of three options is available—"Add Reach", "Remove Reach", and "Move Reach". Selecting "Add Reach" will open a window that prompts you to right-click on the reach to which the new reach will be connected. Do so and choose the desired connectivity relationship from the following menu of three options: "Position Reach Upstream Left of ...", "Position Reach Upstream Right of ...", or "Cancel". Selecting "Cancel" will stop the reach addition process. Selecting either of the first two options will open the "New Reach" window (Screen 10.4.6). Fill out the required information in this window. Click OK to save changes or Cancel to stop the addition process.*

Selecting "Remove Reach" will open a window prompting you to delete the segment. To delete, select Yes; to not delete, select No.

Selecting "Move Reach" provides options similar those in "Add Reach".

For watersheds delineated using Reach File Version 3 data, the connectivity will frequently not be complete. You will need to manually connect the stream reaches using the visualization screen functions.

Screen 10.4.6

5. Select the **Reach Characteristics** button to view and edit reach parameters related to length and elevation. Data in this window (Screen 10.4.7) include Reach #, Reach Name, Length, Delta h, and Elevation. Length refers to the length of the reach segment (in miles). Delta h refers to the change in vertical elevation over the length of the reach (in feet). Elevation refers to the average elevation of the reach segment (in feet).

Tip: *Clicking on the column heading displays a definition of the parameter, as well as units. The same functionality exists in tables throughout the **NPSM** interface.*

Values in this table have been transferred directly from Reach File, V1 in BASINS. Values of -9999.000 are not acceptable and result from missing data in the database. These values must be edited directly on this screen before running the model.

Click **OK** to save any changes and leave this window or **Cancel** to leave the window without saving changes.
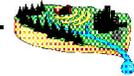

|	Reach #	Reach Name	Length	Delta h
1	05010007012	BLACKLICK CR	20.4000	401.0000
2	05010007013	BLACKLICK CR	15.6000	599.6390
3	05010007014	BLACKLICK CR	15.6000	498.3260

Reach identification number

Screen 10.4.7

> *Tip:* *Missing data can easily be generated using basic topographic maps. Missing data on this screen can be also be derived from other data sources in the BASINS GUI. Toggle between the NPSM interface and the BASINS GUI (if you have executed NPSM from within the BASINS View) by pressing the ALT and TAB buttons on your keyboard at the same time and selecting the ArcView icon. In BASINS View, turn on the DEM theme for your area of interest and the Reach File, V1 theme. First be sure that the length values in the NPSM interface are representative of the reaches you are modeling. The length value extracted from BASINS is the length of the most downstream reach segment for each of the watersheds you previously delineated. If you did not develop your watershed's pour point to coincide with a reach segment node, or if you delineated a fairly large watershed with multiple Reach File, V1 stream reaches, you may need to measure a new segment length and put this value in the Length column of the "Reach Characteristics" window. The Measure tool in the BASINS GUI can be used to measure a new length. Missing elevation and delta h values can also be determined by identifying the elevation (using the DEM theme) at the most upstream end of your reach segment and at the most downstream end. Elevation is simply the average of the upstream and downstream elevation values, while delta h is the difference between these two values. These values should also be entered into the appropriate columns of the "Reach Characteristics" window.*

6. Select the **F-Tables** button to display the function tables or rating curves used for flow calculations. If all required information for construction of these tables was available from the Reach File, V1 database in BASINS, eight rows of values for Depth, Area, Volume, and Outflow will be populated for each reach in your reach network (Screen 10.4.8). These tables must be complete for each reach in the network to run a successful simulation.
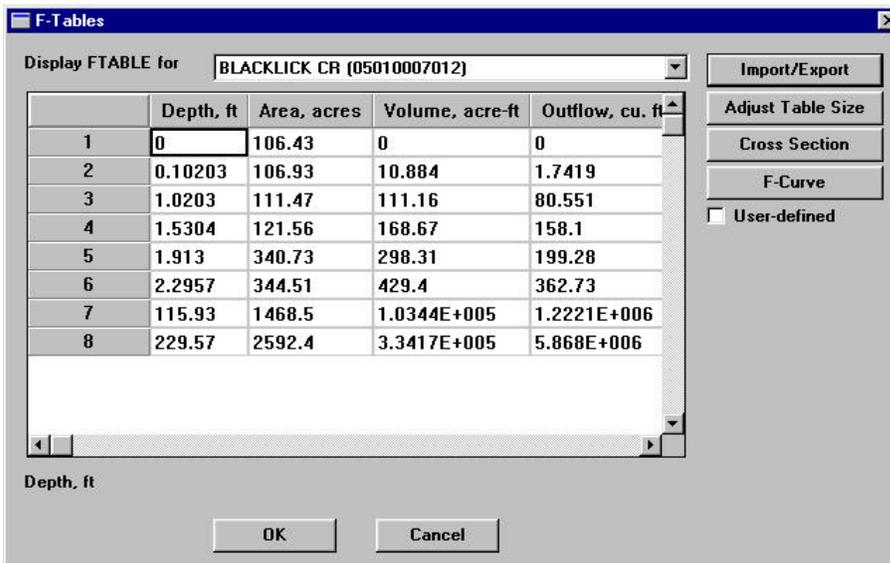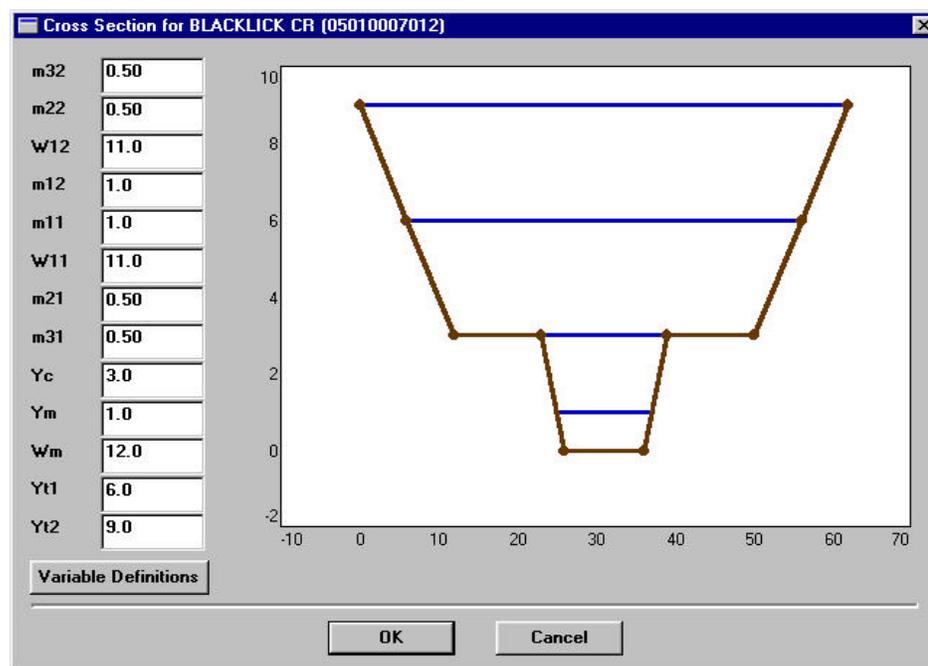

Screen 10.4.8

The relationship between the stream depth and flow rate can also be seen using the **F- Curve** button. This curve can be displayed on various axis types (linear or logarithmic). To plot on a logarithmic scale change the zero values in the depth and outflow fields to a small value (e.g., 0.0001) Depth and flow rates can be displayed for any point on the curve using the mouse (Screen 10.4.9). Depth and flow

are displayed on the left side of the screen. The units of the displayed values are the same as those on the axis scales.
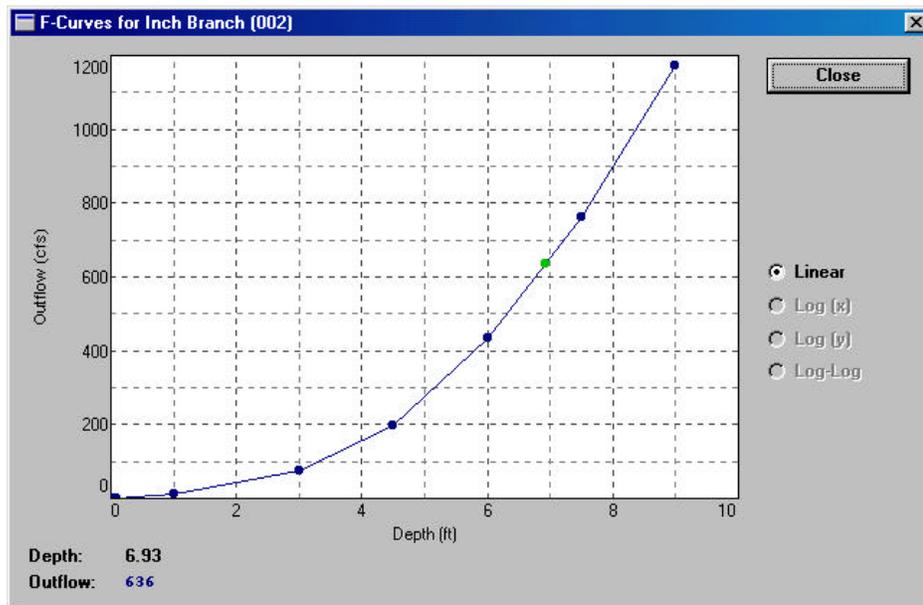
Screen 10.4.9

The stream cross section can be displayed using the **Cross Section** button. To adjust the F-Curve and F-Table to actual stream morphology, modify and update the cross section characteristics (Screen 10.4.10).
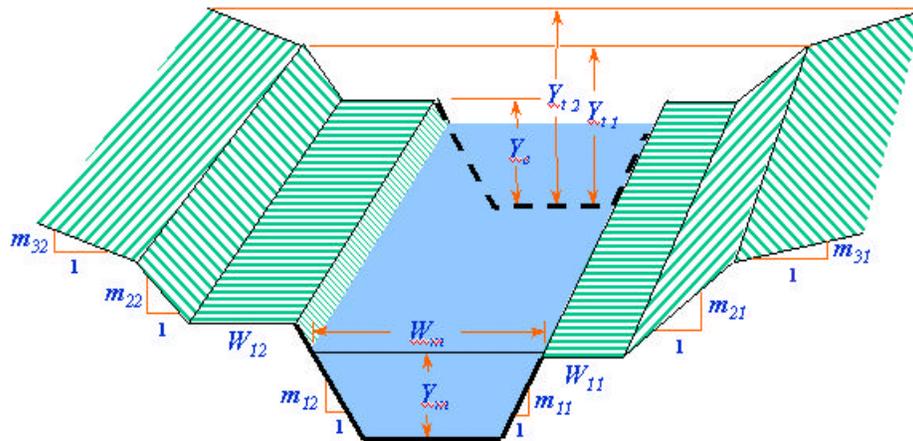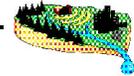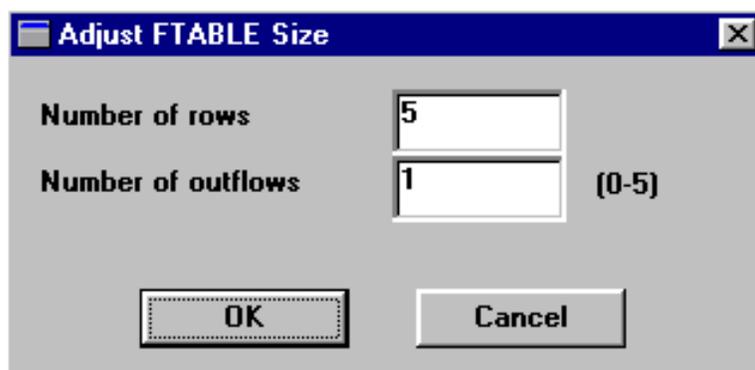

Screen 10.4.10

Figure 10.4.1

Use the left mouse button to vertically or laterally adjust various elements of the cross section. The vertical parameter table can also be used to adjust the cross section configuration. For assistance on cross section parameters, use the **Variable Definition** button (Figure 10.4.1).

The tables for each reach can be displayed by clicking the down arrow next to the "Display FTABLE for" box. These tables can be edited if a better stream representation is available. The number of rows can be adjusted by clicking on the "Adjust Table Size" button and making changes to the "Number of rows" box on the following screen (Screen 10.4.11). "Number of outflows" refers to multiple exits from your reach. Currently, NPSM supports a single outflow. Click **OK** to save changes and exit the "Adjust FTABLE Size" window or click **Cancel** to exit without changes.

If the F-Tables are not populated for each of the stream reaches, it is necessary to either develop them from scratch by using the "Adjust Table Size" option and providing the values directly in the F-Tables, or by using the Import option, which develops the F-Tables based on a limited set of stream characteristics.

Click on the **Import/Export** button to import the required data. The "F-Table Import/Export" window appears (Screen 10.4.12). Currently, only one option is available on this screen. This option is used to import stream characteristic data (from the Reach File Version 1 database in BASINS) to calculate F-Tables, while assuming a trapezoidal cross-sectional representation. Click the "**...**" button.
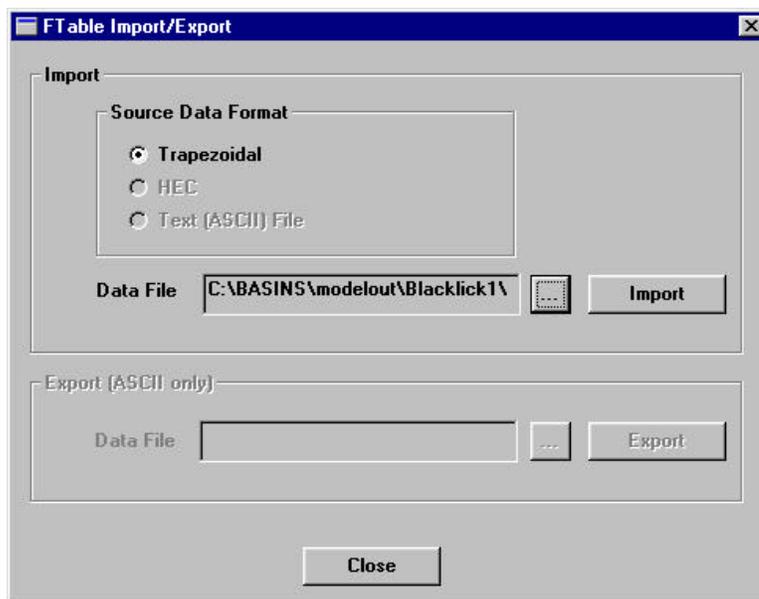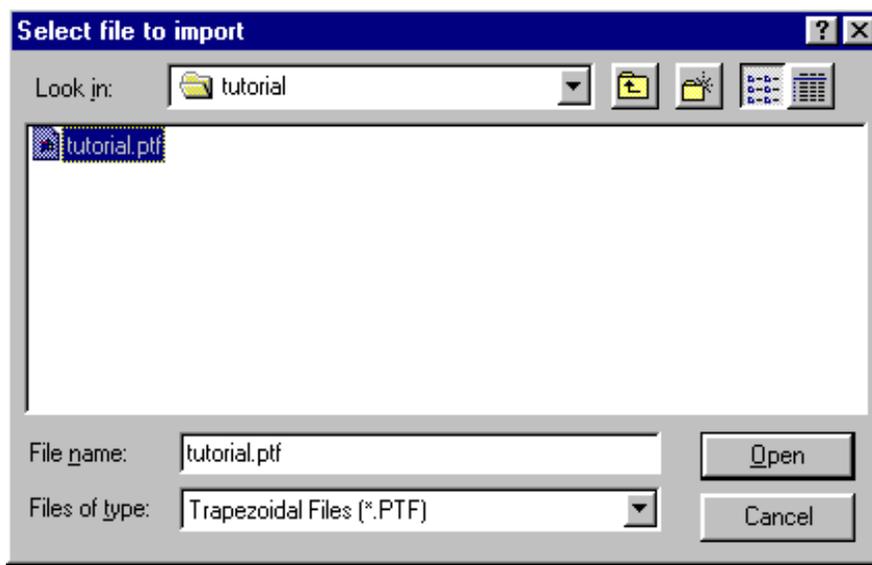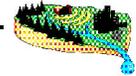

Screen 10.4.11

The subsequent window (Screen 10.4.13) prompts you to select the file to import. Be sure that the directory in the "Look in:" box matches the project name you defined for your project. This directory is located within the BASINS\MODELOUT\ directory. A file denoted by your project name and a .ptf extension should appear in the file list. Highlight this file and click **Open**.

After the file name appears in the "Data File" box, click the **Import** button.

Tip: Check that the last row of the F-Table has a very large depth. This will ensure that the model does not calculate a depth out of range of the F-Table during the simulation. If this depth is too small compared to the depth at potential high flows, the simulation will fail. To change this depth by recreating the F-Table, use the Import method discussed below.

Screen 10.4.12

Screen 10.4.13

The "Trapezoidal Import Data Review" window appears (Screen 10.4.14). This window displays a table containing the following values for each reach: Reach ID, L (reach length, ft), Ym (mean reach depth, ft), Wm (mean reach width, ft), n (Manning's roughness coefficient, dimensionless), S (longitudinal reach slope, ft/ft), Type (trapezoidal, the only representation currently available), m32 (side slope of upper flood plain left), m22 (side slope of lower flood plain left), w12 (zero-slope flood plain width left, ft), m12 (side slope of the channel left), m31 (side slope of upper flood plain right), m21 (side slope of lower flood plain right) w11 (zero-slope flood plain width right, ft), m11 (side slope of the channel right), Yc (channel depth, ft), Yt1 (flood plain side slope changes at depth, ft), Yt2 (maximum depth, ft), Exits (# of exits), Fraction 1 (fraction of flow through Exit 1), Fraction 2 (fraction of flow through Exit 2), Fraction 3 (fraction of flow through Exit 3), Fraction 4 (fraction of flow through Exit 4), and Fraction 5 (fraction of flow through Exit 5). Currently, the Exits and Franction 1 values should be set to 1, because only one outflow can be simulated. Parameters defining the channel cross section are shown on Figure 10.4.1. Values for all of these variables must be appropriate to develop a working F-Table.

Click **OK** to save changes and proceed or **Cancel** to proceed without saving changes.

Screen 10.4.14

A message box will notify you that import is complete (if successful) or that F-Tables were not calculated for specified reaches (if unsuccessful). In either situation, click **OK** to continue. If F-Table calculation was unsuccessful, review the available data and repeat the import process.

Once the F-Tables for all reaches are complete, click **OK** to save changes and continue. Click **Cancel** to continue without saving changes.

7. Click **Done** to exit the "Reach Editor" window.

Tip: *Clicking the cursor and dragging the line between column headings from left to right allows you to increase the width of any column in the table.*

TUTORIAL

•   *Select F-Tables.*

•   *Select the Import/Export... option.*

•   *Select "..." open the run1.ptf file located in BASINS\MODELOUT\TUTORIAL, and click Import.*