Introduction to Bentley FlowMaster
CE 365K, Hydraulic Engineering Design, Spring 2015

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Contents

Goals of the Tutorial

This tutorial will introduce you to the capabilities of the Bentley FlowMaster Program. This includes hydraulic design and analysis of pipes, channels and other flow elements, creating rating curves, and creating channel cross-sections.

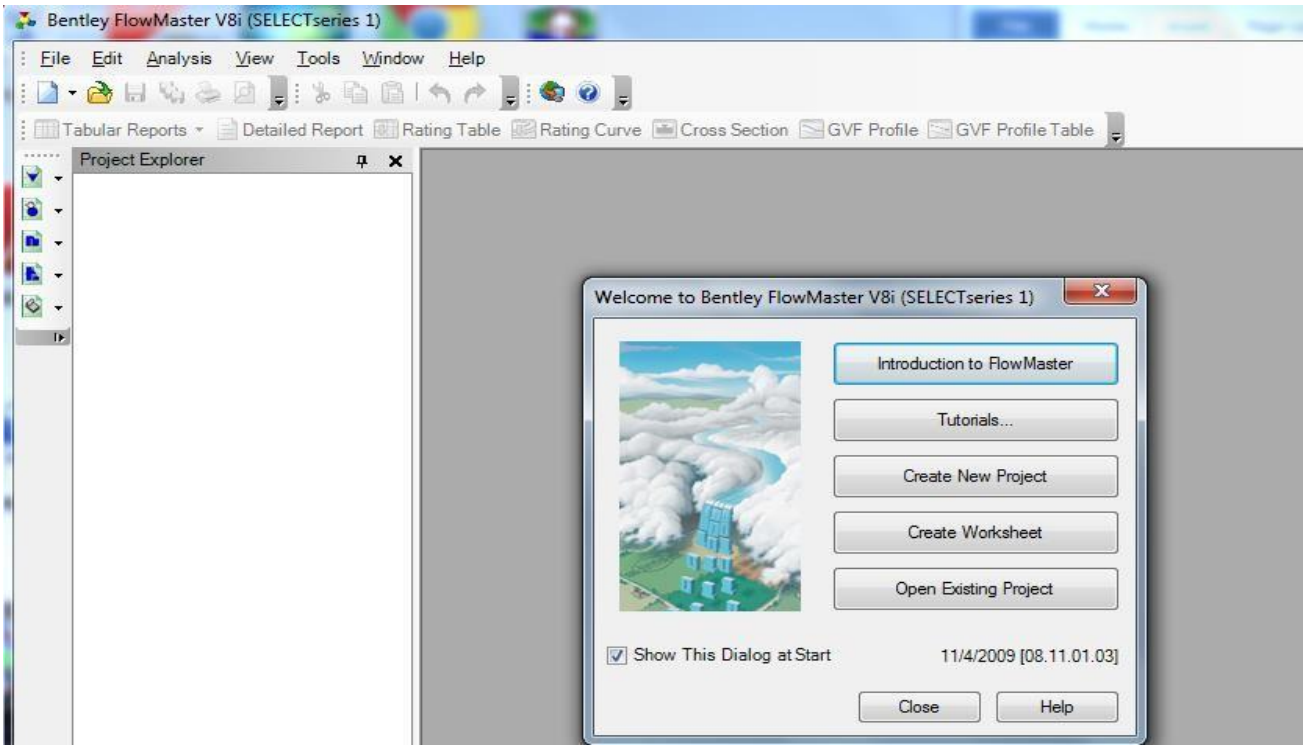
Procedure

(1) Opening Bentley FlowMaster

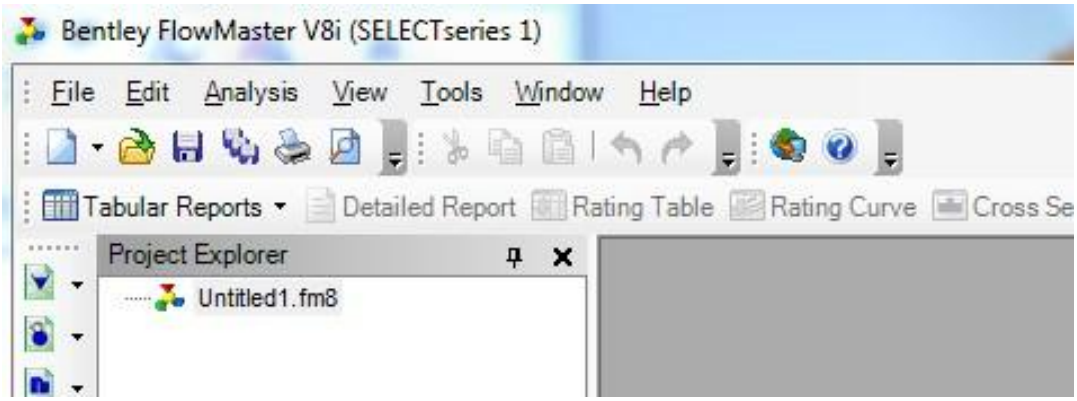
Open the program by double-clicking the FlowMaster icon, seen below, on your desktop or click **Start > All Programs > Bentley > FlowMaster, and select FlowMaster**.

(2) Using Bentley FlowMaster

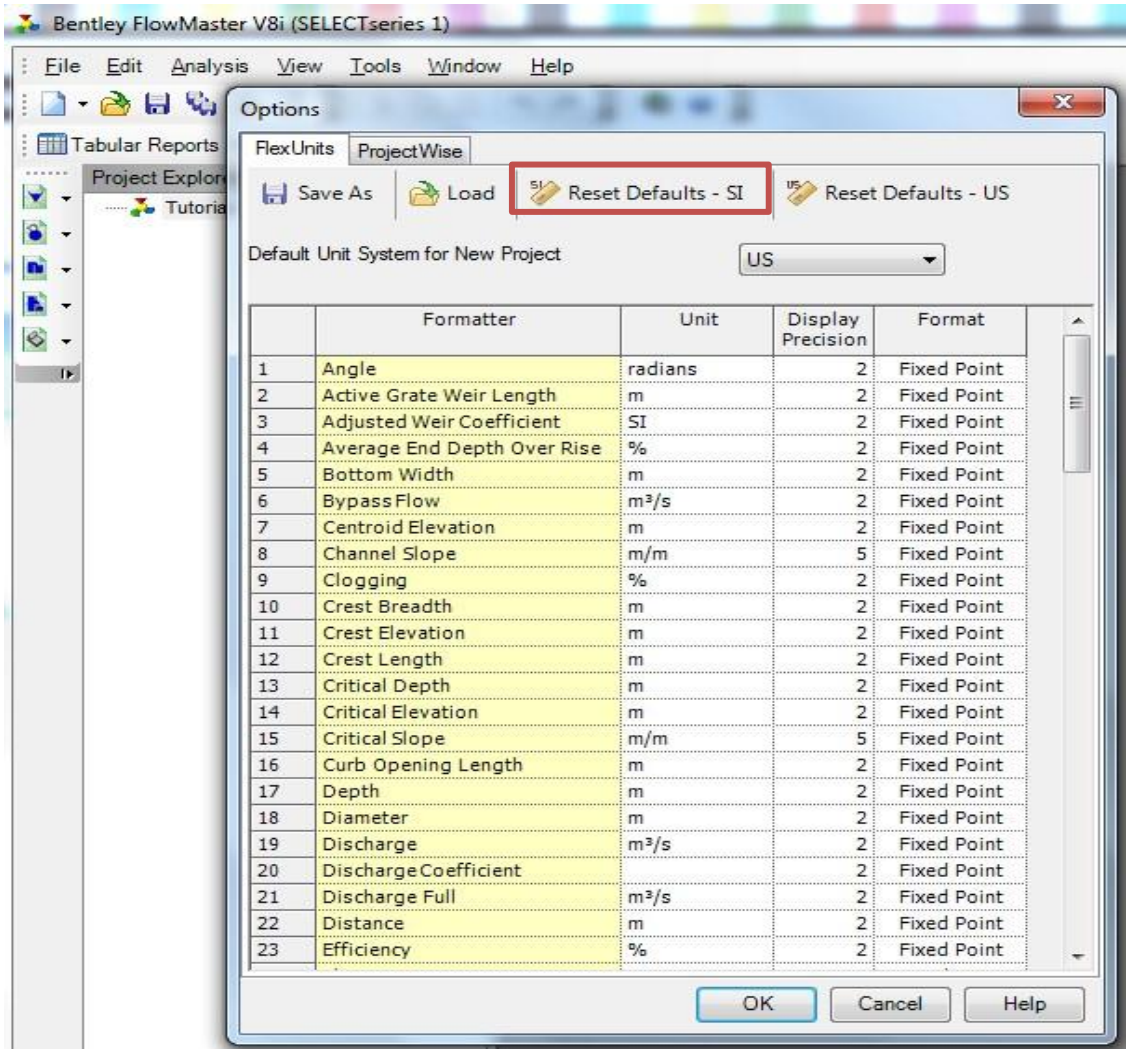
Once you are in the program, you should see the welcome window pictured below.



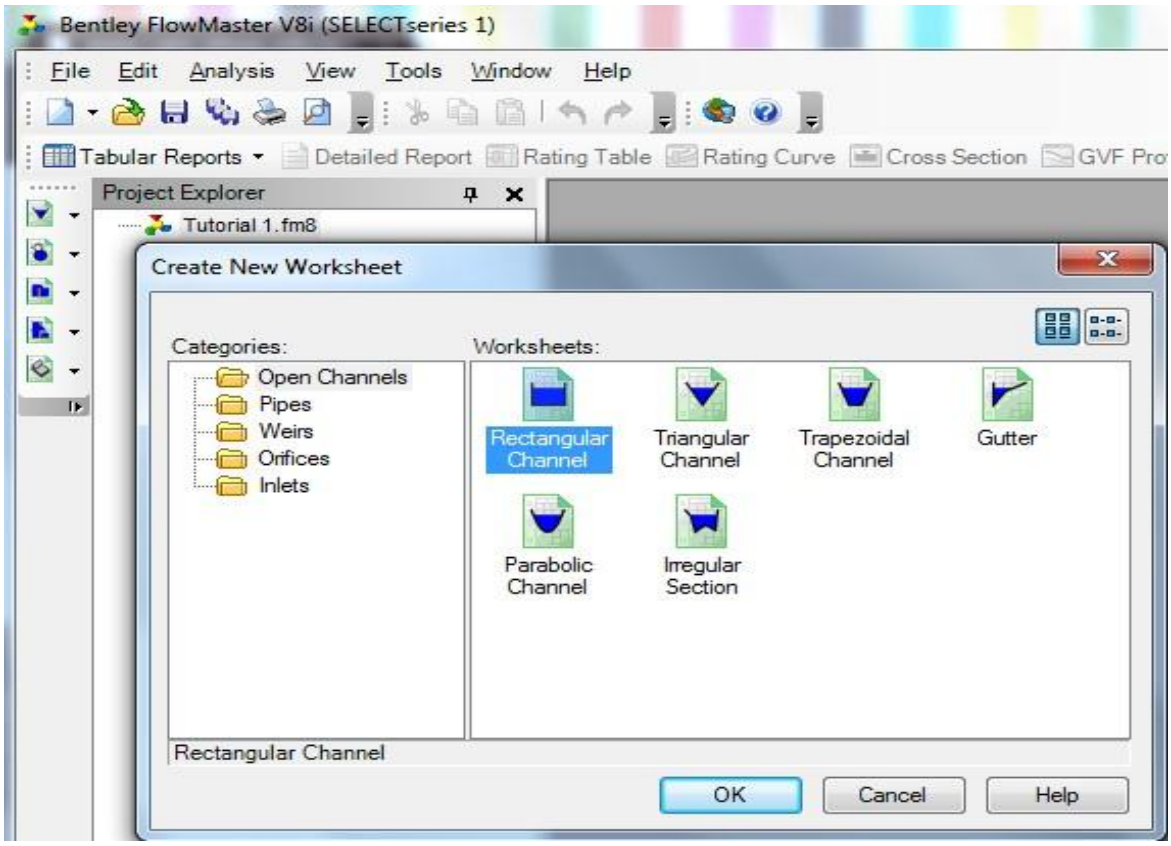
In the welcome window, select **Create New Project**. A project titled **Untitled1.fm8** should appear under the Project Explorer Panel on the left. Right click on the project and choose **Save As**. **Navigate to the folder** you will be using to save your files, **enter a filename** and choose **Save.**



Before starting an analysis, it is important to check the default unit system for the project. Go to **Tools** on the top menu bar, and select **Options.** To change the unit system from US to SI, select **Reset Default-SI**, and click **Okay.** For this tutorial SI units will be used.

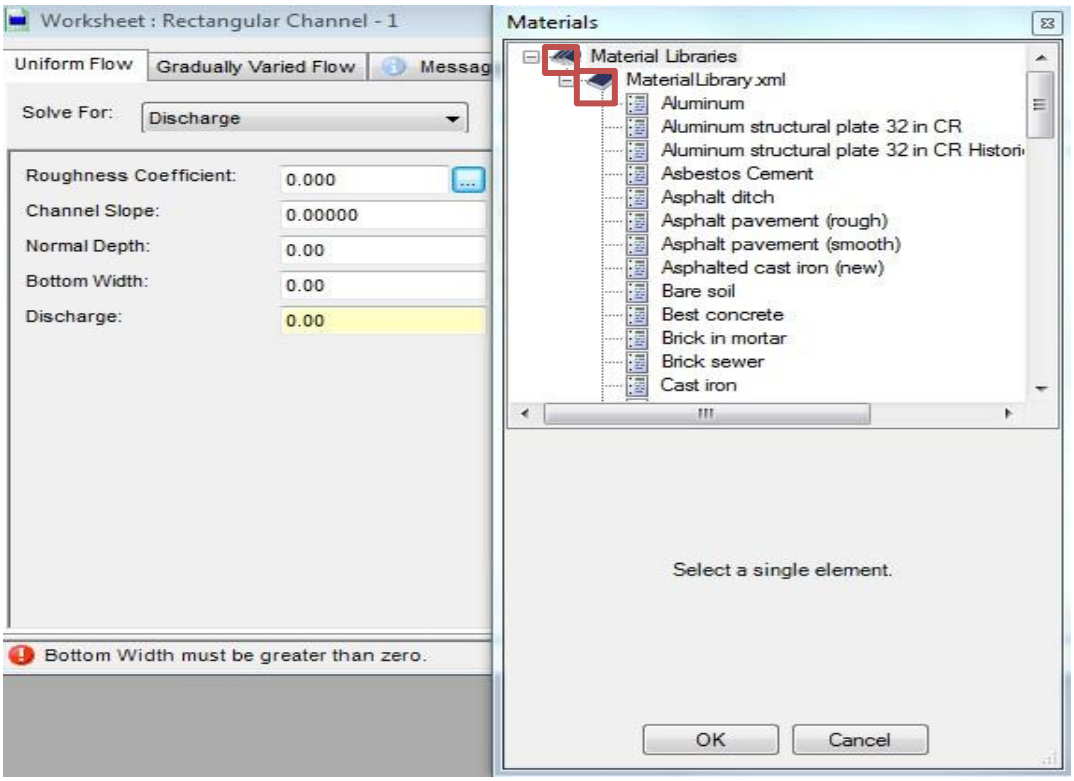


Under **File** in the menu tab, **select New**, then **select Worksheet.** In the **Create New Worksheet** you can explore the various flow elements that FlowMaster can analyze. An unlimited number of worksheets can be created within a project file to analyze a variety of flow elements. To begin, **select Open Channels** under Categories and then **double-click Rectangular Channel.**

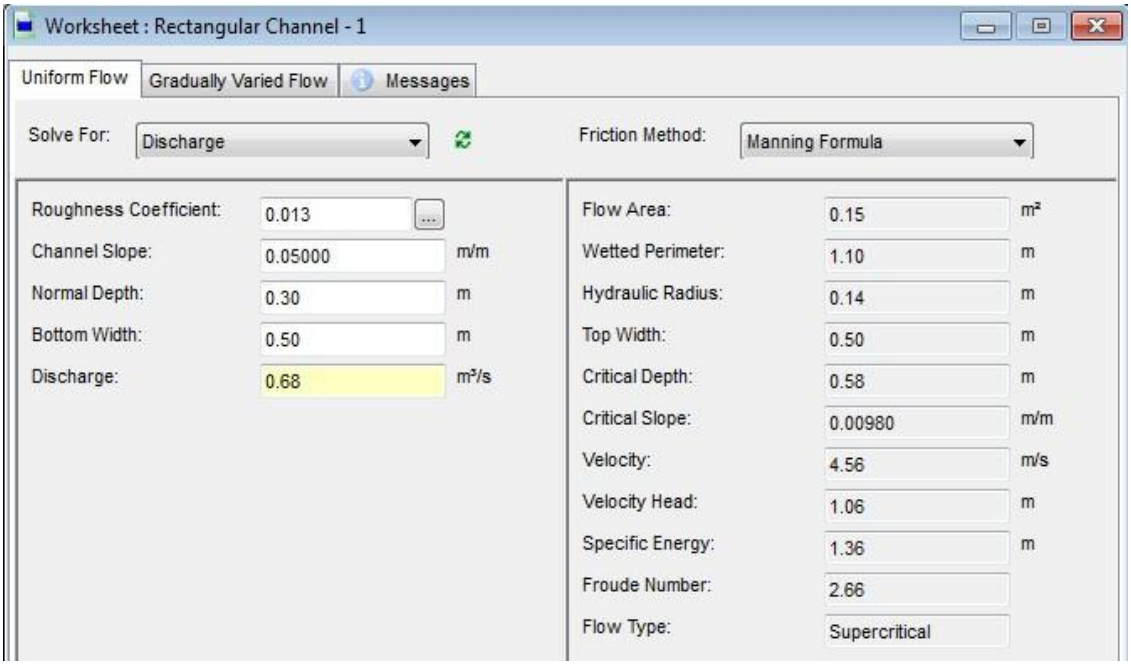


You will see the new worksheet for a rectangular channel on the screen. Select the tab next to **Solve For:** to view the channel variables FlowMaster can calculate. From these options **select Discharge.** Let's use FlowMaster to solve for the discharge of a **concrete rectangular channel** with a **longitudinal slope of 5%**, a **maximum depth of 0.3 meters**, and a **base width of 0.5 meters** using Manning's Equation. **Select** the tab next to **Friction Method**, and choose **Manning Formula**.

Under the **Solve For** tab are spaces to enter data for the rectangular channel. To enter the data for the Roughness Coefficient, select the ellipsis button, ..., next to the data field. A materials tab will appear on the screen. **Expand the Material Libraries, and Expand the MaterialLibray.xml,** pictured below. Scroll down through the materials, **select Concrete** and **click Okay**.



Enter the Channel slope as a decimal, 0.05, in the channel slope field. **Enter** 0.3 in the **Normal Depth** Field, and **enter** 0.5 in the **Bottom Width** Field. The Discharge Field is highlighted in yellow because it is the field FlowMaster is solving for. To solve for the channel discharge select the solve button, . The results of the analysis are seen below.

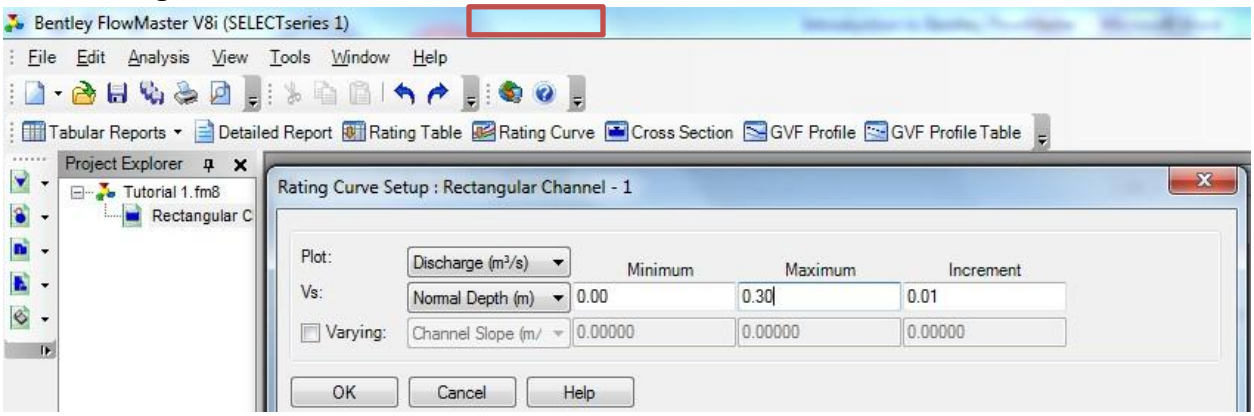


(3) Creating a Rating Curve

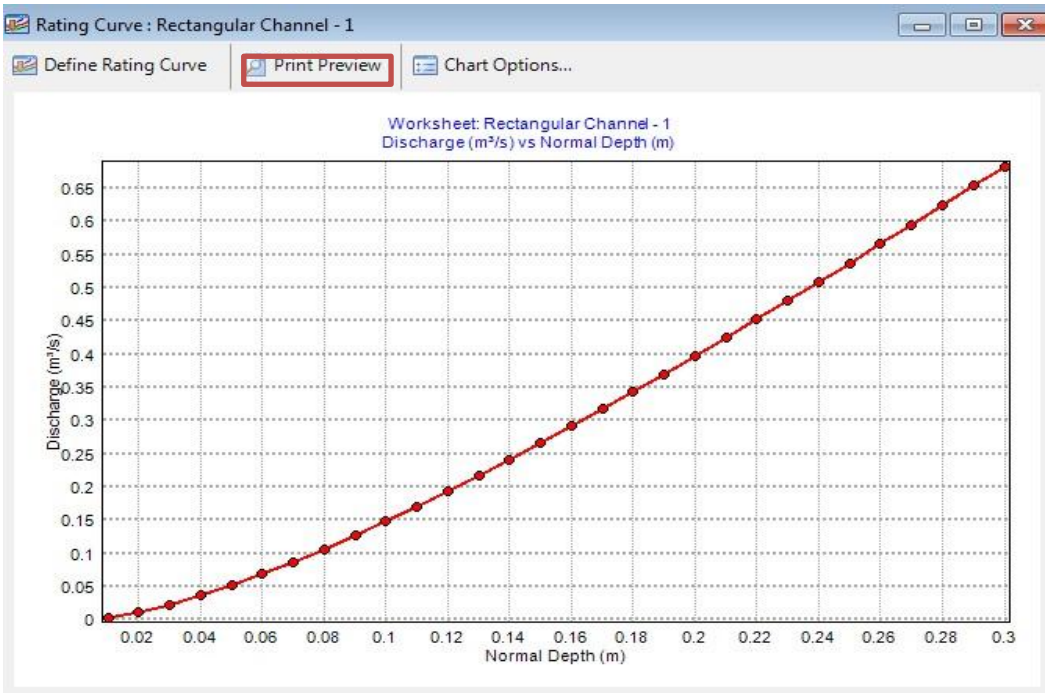
FlowMaster can be used to create rating and plot curves for flow elements that have been analyzed. To create a rating curve, discharge versus depth chart, for this channel select the Rating Curve Button, 

. In the **Plot** field **select Discharge (m^3/s)**. In the **Vs.** field **Select Normal Depth**. **Enter** 0 as the **Minimum** Value, 0.3 as the **Maximum** Value, and 0.01 as the **Increment** Value. For this analysis we will only plot Discharge versus Normal Depth, so **select OK**. If the rating curve does not come out looking like what you expect, check that you are plotting discharge vs normal depth. The default is to plot Discharge vs Roughness.

Note: FlowMaster allows you to create a different kind of rating curve by check the varying box and selecting another variable in the Vs. Field.

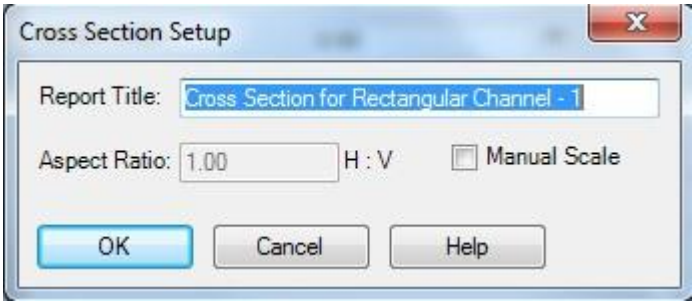


A rating curve, pictured below, should appear on the screen. To customize the rating curve use the Chart Options tool by **selecting** the **Chart Options…** icon.



(4) Creating a Channel Cross-Section

Under the Analysis menu bar, select the **Cross Section** button. **Note: The rating curve window must be closed to create a channel cross-section. Enter** the **Report Title** in the Cross Section Setup, and select **OK**.



After selecting OK, the channel cross-section will appear on the screen. To print the crosssection, **click Print Preview** and then **click Print**.