Velocity Mapping in Rivers and Floodplain using HEC-GeoRAS

Prepared by

Venkatesh Merwade

School of Civil Engineering, Purdue University

vmerwade@purdue.edu

November 2010

Introduction

The objective of this tutorial is to create a 2D velocity map from a 1D HEC-RAS model. Even though HEC-RAS is a 1D model, which gives only one value each for velocity and water surface elevation, it is possible to create a velocity distribution across a cross-section in HEC-RAS by dividing a cross-section into number of regions. If HEC-RAS is run by distributing the flow into these different regions, you will get a velocity distribution, which can then be used in ArcGIS to create a velocity distribution map.

This tutorial is a follow up to the HEC-GeoRAS tutorial available at http://web.ics.purdue.edu/~vmerwade/education/georastutorial.pdf. This tutorial cannot be completed without first completing the GeoRAS tutorial because no data are supplied with this tutorial. You will use the results from GeoRAS tutorial to follow this tutorial. The instructions given below describe the procedure in creating a velocity distribution map using HEC-GeoRAS. You can use the same HEC-RAS file that you used in the GeoRAS tutorial for creating the flood inundation map.

Open the previously saved HEC-RAS project. **Click** on *Run→Steady Flow Analysis*. In the *Steady Flow Analysis* window, **click** on *Options→Flow Distribution Locations* to get the *Set Locations for Flow Distribution* window as shown below. In this window, **set** the number of sub-sections you want to have in the left bank (LOB) , Main Channel (Channel) and right bank (ROB). If you want to have same number of sub-sections for all cross-sections, you can use the *Set Global SubSections* option, or you can set sub-sections by selecting individual cross-section in the *Set Specific Location Subsection Distribution* option.
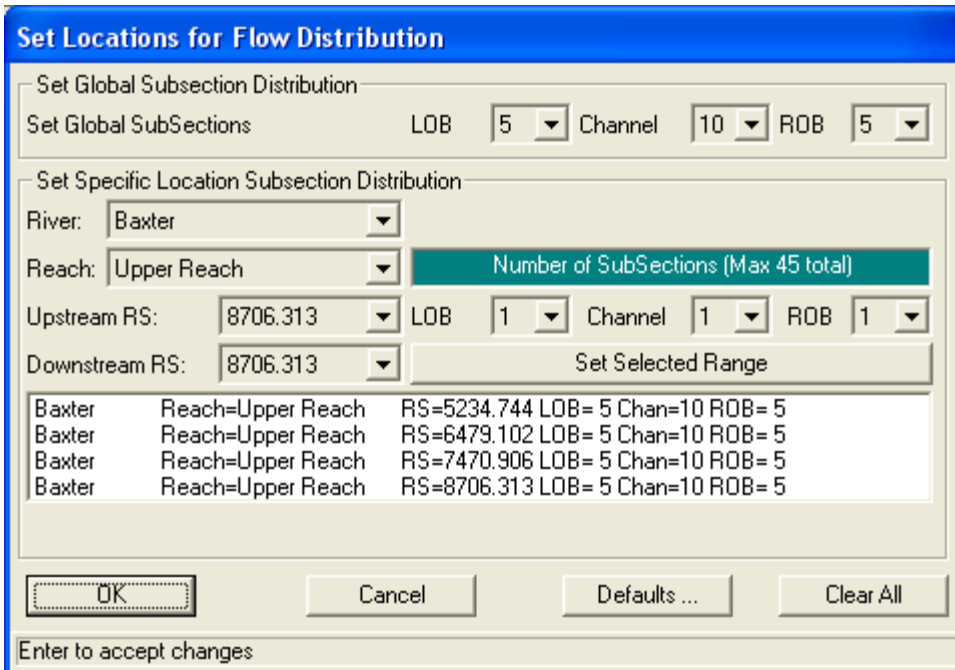
Click **OK**, and then run the steady flow analysis by following the instructions on Page 27-28.

After the model is run successfully, export the output by **selecting** *File→Export GIS data*. In the *GIS Export* window, make sure to **select** *Export Velocity Distribution* option as shown below.
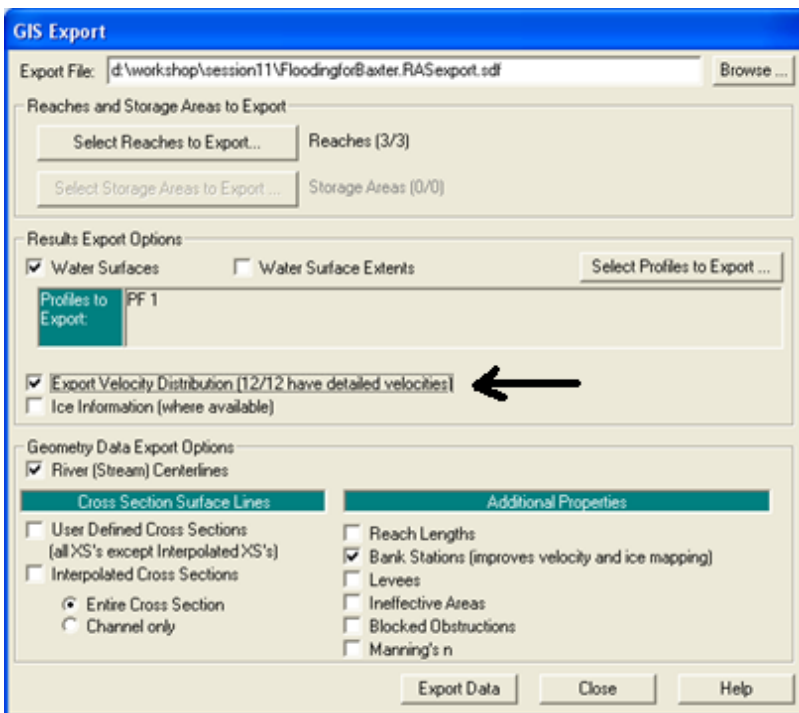
After the data are exported to a .sdf extension GIS file, follow the instructions on Page 29-32 to import the sdf file data into ArcGIS to create a flood inundation map.

After getting the flood inundation map, Click on RAS Mapping→Velocity Mapping. Select the profile for which you want to plot the velocity distribution, and click OK as shown below.
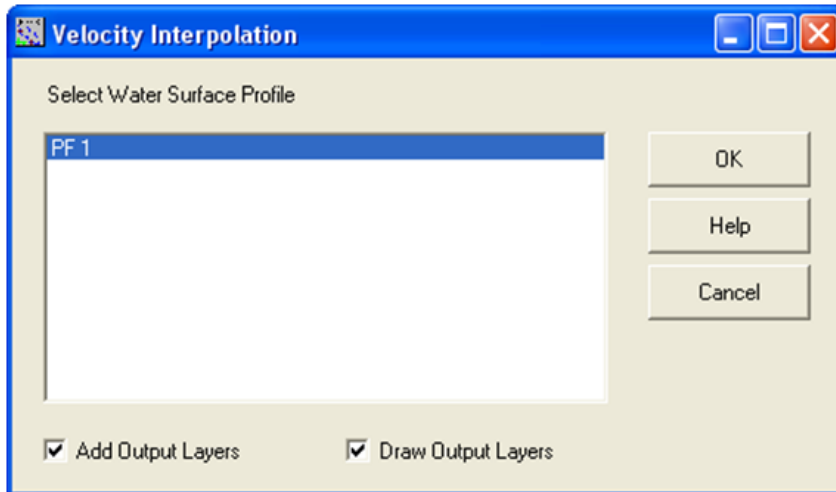
After the process is complete, you should see a velocity distribution map as shown below.
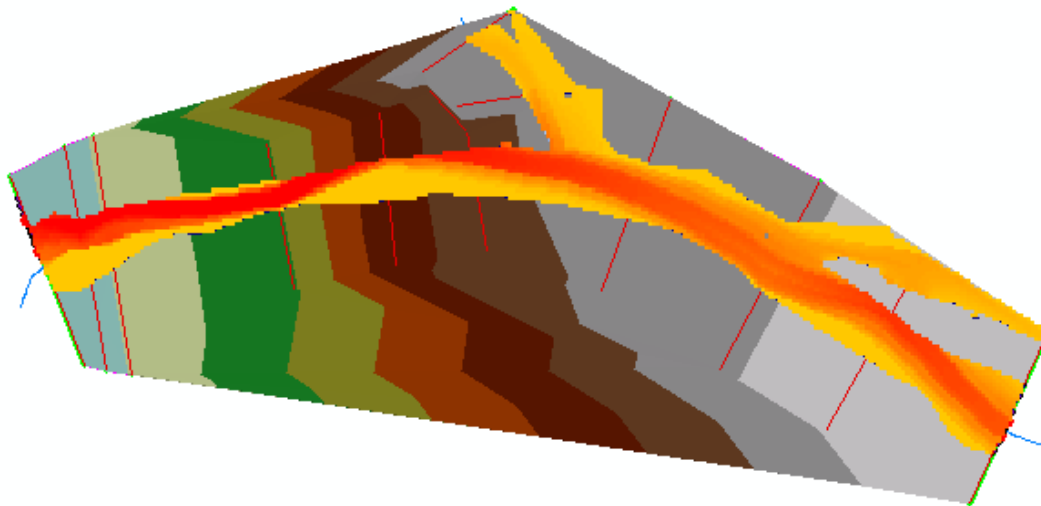
If you get a velocity map like above, congratulations! You are done!!