Calibration of the Mississippi – Ohio River Workshop

Introduction

This workshop will help students learn how to use HEC-RAS to calibrate a model. Students will learn how to adjust parameters to replicate water surface elevations, discharges, and travel times with observed data. *While this data is from an actual study, the model and results of this workshop do not represent current or future conditions of the river.*

Background

Figure 1 shows the Mississippi River from Thebes, IL to Hickman, KY (approximately 76 river miles) and the Ohio River from L&D 53 to its mouth at Cairo, IL (approximately 17 river miles). Stream gages are located along the Mississippi River at Thebes, Thompson Landing, Birds Point, and Hickman. Stream gages are located along the Ohio River at L&D 53 TW and Cairo. The Cairo gage is very close to the confluence of the two rivers; therefore, the stages at Cairo are representative of both rivers.

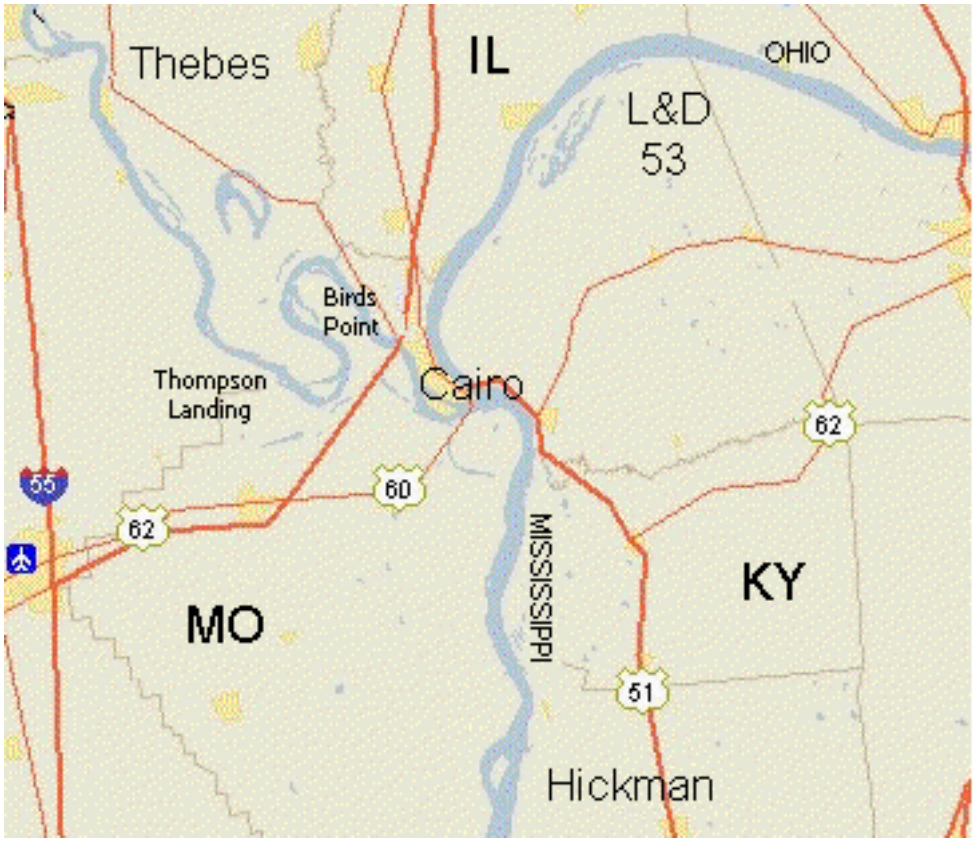

Figure 1 Mississippi - Ohio River Junction

Problem Description

A project file (**MissOhioRiv.prj**) with the title "**Mississippi – Ohio River System**" has been loaded on your workshop computers. This file contains all the data for this workshop. The upstream boundary conditions for this model are flow hydrographs from water year 1985 located at Thebes and L&D 53. The downstream boundary condition for this model is observed stage located at Hickman. The observed stages at the gages will be used to calibrate the model.

Tasks

The following is a summary of the required tasks for each group:

1. Calibrate the Model by Adjusting Manning's n Values

Adjust Manning's n values for every reach to adequately match the computed stages with the observed stages at each gage. The focus of the calibration is to accurately capture the peak events. Once the results are satisfactory, proceed to Task 2 to refine the results.

Note: The easiest method of adjusting Manning's n values for multiple cross sections is the **Manning's n or k values…** table located in the **Geometric Data Editor** under the **Tables** menu.

2. Adjust the Calibration using Flow Roughness Factors

Evaluate each gage to determine if the computed stages are too high or too low for a conveyance interval. Adjust the Manning's n for these intervals using **Flow Roughness Factors**, located in the **Unsteady Flow Analysis Window** under **Options**.

For Example: At a particular gage the computed stages are always below the observed stages for flows between 100,000 and 300,000 cfs. The **Flow Roughness Factors** option can be used to enhance the calibration for flows between 100,000 and 300,000 cfs, at cross sections above and below the gage.

3. Complete the Table

When satisfied with the results of the calibration complete the following table for the difference (in feet) between computed and observed stages for the each time step.

Difference Between Observed and Computed Peak Stages			
Location	Time		
	06 Nov 1984	04 Jan 1985	01 Mar 1985
Thebes RS 43.7 on Upper Mississippi			
Thompson Landing RS 20.2 on Upper Mississippi			
L&D 53 RS 17.39 on Ohio River			

Questions

1. How well does the timing match for the observed and computed stages?

2. How well are the stages at Thompson Landing reproduced? Are there any inconsistencies between the observed stage and computed flow at Thompson Landing which make it difficult to calibrate?