

Florida International University
Department of Civil and Environmental Engineering
CGN5930: Unsteady Flows in Rivers and Pipe Networks
Instructor: Arturo S. Leon, PhD, PE, D.WRE

Homework 1 / Mini Project 1, Spring 2019

Name of Student: _____ Due Date: 02/13/2019

1. **Inundation in Steady Flow Conditions:** The flow data for the Baxter River (Figure 1) is presented below:

Flow upstream of upper reach (Baxter River) = 136,000 cfs

Flow upstream of tributary (Tule Creek) = 4,000 cfs

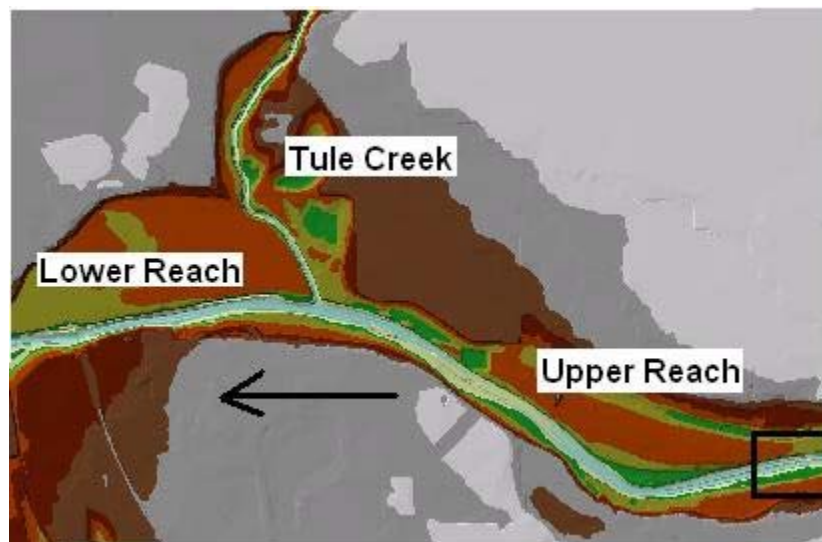


Figure 1: Plan view of Baxter River

- (a) Assuming that there is a waterfall (e.g., drop) at the downstream end of Lower Reach, provide recommendations to mitigate floods in the urban area adjacent to the Baxter River shown in Fig. 1 (e.g., provide locations and heights of levees to avoid/minimize flooding).
- (b) Assuming that the first 10 km river stretch downstream of Lower Reach has a near-constant cross-section and longitudinal slope, provide recommendations to mitigate floods in the urban area adjacent to the Baxter River shown in Fig. 1 (e.g., provide locations and heights of levees to avoid/minimize flooding). The average longitudinal slope of this 10 km river stretch is 0.0001.

- The data for the Baxter River can be downloaded from http://web.eng.fiu.edu/arleon/Teaching_unsteady_rivers.html
 - State the assumptions you made in your solution.
2. Compute the flow discharge in a rock rectangular channel ($n = 0.035$) having a bottom slope of 0.001, a bottom width of 5 ft, and flow depth of 3 ft. What is the critical depth at this flow? Is the flow critical, subcritical, or supercritical? You can make the calculations by hand or you can write a computer program.
 3. A trapezoidal channel with bottom width of 10 m and side slopes of 1V:1.5H conveys a flow of 80 m³/s. The channel bottom slope is 0.002 and $n = 0.015$. A dam was recently built in this channel, which raised the flow depth to 10 m at the location of the dam. Compute the flow depth in the channel 250, 500 and 750 m upstream of the dam. You can make the calculations by hand or you can write a computer program.