

Laboratory on Streams and Stream Patterns

This short lab exercise will introduce you to looking at stream patterns on the landscape. The patterns are generated from random headward erosion regional structural control. See Ritter and others "Process Geomorphology" for patterns and controls. In your analysis, keep in mind the climate and geology as you know it.

Materials: Tracing paper (4 sheets) or transparency film. A pair of dividers for measuring distances is convenient but not critical. The orientations of your sheets is important to insure similar products. Landscape orientation refers to the longest dimension of the sheet is horizontal. Portrait orientation is with the longest dimension vertical.

1. Topographical Map: **Warm Springs, GA Winter home of President Roosevelt.**

- a. (6pts) Draw the stream pattern for Cane Creek and its tributaries, starting from the point where the creek passes underneath the railroad bridge of the Atlanta Birmingham and Coast Railway just south of Woodbury. Your sheet should be placed in landscape position, with the top of the sheet level with the top of the circled "18" at Andrews Crossing. The right hand edge of the sheet should align with the red vertical (north-south) dashed line from Woodbury. The edges of the sheet will be parallel to the edges of the map.
- b. (2pts) Identify the drainage pattern.
- c. (5pts) Label the streams according to the stream order according to Shreve (1967), see Ritter for reference.
- d. (5pts) Label the streams according to Strahler (1952).
- e. (5pts) Compare and contrast the numbering methods.
- d. (5 pts) Plot the number of streams within each stream order, using the Strahler method, similar to figure 5.18 in Ritter. Note that the ordinate scale is logarithmic.

2. Topographic Map: **Warm Springs, GA.**

- a. (2pts) Orient the tracing sheet in portrait, with the top edge along the top edge of the quadrangle map and the right edge along the right edge of the map sheet. Draw the stream pattern for the tributaries that drain Pine Mountain, along the outside rim, to the main channel in Cane Creek and to Pigeon Creek and terminating in the Flint River. Confine the "rim" from Dripping Rocks to Fire Tower to Huckleberry Pinnacle to Cedar Tree Hollow.

- b. (2pts) Identify the drainage pattern.
- c. (2pts) Determine the sinuosity of the entire length of the Flint River visible on the map. Show your work.

3. Topographical Map: **Paw Paw, MD,WV,PA**

- a. (2pts) Orient the tracing sheet in portrait. The bottom of the tracing sheet should go through the 2nd c of Cacapon Mountain and the "p" in Warm Springs Ridge. The right hand side of the sheet is aligned along the right hand side of the map sheet. Draw the stream pattern of the Long Hollow on both sides of the Potomac River. Include the short segment of the Potomac between the two sections of the Long Hollow.
- b. (2pts) Identify the stream pattern.
- c. (5 pts) Label the streams according to the stream order proposed by Strahler.
- d. (5 pts) Again plot the number of streams within each stream order similar to figure 5.18 in Ritter. Note that the ordinate scale is logarithmic. Do not include the Potomac.
- e. (4pts) Compare the stream patterns for Cane Creek and Long Hollow. Why are they different, what is the cause? Do the plots of stream order add any information to our understanding of the differences between stream patterns?

4. Topographical Map: **Paw Paw, MD,WV,PA**

- a. (2pts) Determine the sinuosity of the Potomac River from Dam No. 6, just upstream from the confluence with the Cacapon River, upstream to the confluence with the Little Cacapon River. Show your work.
- b. (2pts) For that reach determine the elevation change. Use the contours that cross the river just upstream from both sites.
- c. (2pts) What is the slope of the river path and what is the slope of the straight line path.
- d. (4pts) What is the shear stress on the river bed if we assume the river depth to be 5 m for the case of the hypothetical straight river and the actual sinuous river? Show your work and give the answer in the m-kg-s system. Which case would move more sand?

5. Topographic Map: **Furnace Creek, CA (Death Valley)**

a. (2pts) Draw the stream pattern to the unnamed ephemeral lake in the center part of the depression. Orient the tracing sheet in landscape and place the lake in the middle. Include the lake outline in your tracing.

b. (2pts) Identify the stream pattern.