

Physical Hydrology for Ecosystems  
BEE 3710

**Assignment#6: Hydrograph separation (3/14)**

The purpose of this assignment is to separate hydrograph data using a variety of techniques.

**1)** The first part of this assignment is to simply apply and compare different hydrograph separation methods: chemical separation and at least one other technique discussed in class. I have provided discharge and stream chloride data for Reedy Creek, VA (Eshleman, et al. 1993. *Water Resour. Res.* 29(10)). This is a hydrograph from a 5.2 cm rainfall event. The watershed is 45.1 km<sup>2</sup>, 20 ha of which is perennial open water and 200 ha is mapped as wetland. The specific tasks required for this assignment are below- display results in graphical form:

- Separate a storm hydrograph into "new" and "old" water based on the hydrochemical technique. (NOTE: precipitation for this storm has a Cl<sup>-</sup> concentration of about 4 µeq/L)
- Separate baseflow and quickflow using any other method we discussed in class (or that you can find in the text, literature, etc.).
- Compare the results among the different techniques. Are any particularly unique? Why?

**2)** Hurricanes Irene and Lee hit upstate NY in late August and early September 2011. Find local rainfall and Fall Creek discharge data for this period and calculate the runoff ratios for the two events between August 27 and ~September 20, 2011. Were they different? Why? (You can use any hydrograph separation technique you want; preferably something different than used in question (1)), compare baseflows before and after these two storms.

**3)** In assignment #4 (the one in which I gave you about 10% of the information you would need to do any of the questions) I asked you to use the Green and Ampt equation, in conjunction with the soil properties handout for a sand loam and clay loam, and estimate how much infiltration you get from a 4.5 cm, 1.5 hr storm. Assume both soils are initially at moisture contents midway between field capacity and wilting point and they are deep soils. How much Hortonian runoff would be generated?

**PROJECT IDEA:** Carry-out a more extensive analysis of any watershed of choice using data over the past several decades. Are there any trends in fraction of discharge that is baseflow or storm runoff; Does the runoff ratio change?