Mini-Assignment 6 – due at 12:30 pm on Thursday, 3/14/2013

If you earned, 20 points or less on Part 6 of the Data Analysis Assignment, and want a chance to recoup some points by proving that you can do a hydrograph analysis, choose Option A. If you earned 25 or 30 points on Part 6, Choose Option B. You cannot chose both options. If you turn in both, I will only award points for Option B.

Option A: Hydrograph analysis second chance

If you earned 20 points or less on Part 6 of the Data Analysis Assignment, you can make up the difference by completing and discussing a second hydrograph analysis as follows. In other words, if you got 0 on the assignment, you can earn up to 30 points. If you got 15 on the assignment, you can earn up to 15 points, etc. But, in order to earn any points, you must **provide answers to all of the questions in table at the bottom.**

Amazingly, there is a second USGS gage on West Creek. This one is farther downstream at Ridgewood Road. This one has a drainage area of 3.87 mi^2, and data are available at: http://waterdata.usgs.gov/nwis/uv?site_no=412325081415500. You will also want to go back to your data from West Creek at Pleasant Valley Road, where correct numbers can also be found in the key of the previous assignment.

1. Download data from November 12-18, 2012 in the tab separated format.
2. Open the file in Excel or another spreadsheet program of your choice. Each variable should appear in its own column.
3. Identify the column that includes datetime and the column that contains discharge (code: 02_00060) and delete the other columns.
4. Find 11:30 am on 11/12/2012. This is where you will start your hydrograph separation. At that time, all discharge is baseflow.
5. Create a new column and label it "baseflow discharge (ft3/s)." In the line for 11:30 am, copy the value for the discharge (1.6 cfs).
6. The hydrograph separation line begins at the point of initial rise for the storm and extends upward at a slope of 0.05 $ft^3/sec/mi^2/hour$ until it intercepts the hydrograph. Operationally, what this means is that you need to take 0.05 ft3/sec/mi2/hour and divide it by the watershed area (3.87 mi^2 at Ridgewood Road) and by the frequency of the measurements (every 15 minutes or 4 per hour). This should give you a value of 0.00323 $ft^3/sec/15$ minutes for the Ridgewood Road watershed.

7. Write a formula that increases discharge by 0.003 ft^3/sec on each line of the spreadsheet. Your formula is going to look something like this: "=C13+0.00323", where instead of C13, you'll reference the line above the one where you are working. Copy and paste that formula down the rest of the spreadsheet. Here's what the first couple of lines should look like.

Time	Baseflow discharge (ft3/s)
11:30	1.6
11:45	1.603
12:00	1.606
12:15	1.609

8. Scroll down in your spreadsheet until you find that baseflow discharge first exceeds the total discharge measured by the USGS. Delete the values for baseflow discharge at this point and thereafter because, baseflow is once again 100% of discharge. This is the end of the storm event and the end of your period of analysis.
9. The formula in the baseflow discharge colume gives you the flux (ft3/s) of baseflow at each timepoint, but what you need is a total baseflow volume (ft3). In order to get that, you need to multiply by the number of seconds in 15 minutes (15x60=900 seconds). Create a new column in your spreadsheet, label it "baseflow volume (ft3)", write in a formula that multiplies your baseflow discharge values by 900 (e.g., "=900*C13), and copy that formula down the rest the rows in your event.
10. Stormflow discharge is the difference between the measured discharge and the baseflow discharge. In order to calculate it, crease a column, label it, and write a formula that gives you discharge - baseflow discharge = stormflow discharge.
11. Similar to baseflow, to calculate stormflow volume, you need to create a column with a formula that multiplies the stormflow discharge by the number of seconds in 15 minutes.
12. Make sure that your baseflow discharge, baseflow volume, stormflow discharge, and stormflow volume columns are filled in for the event period, and then sum the baseflow volume and stormflow volume columns to get a total baseflow and a total stormflow for the event.
13. Calculate the percent of event discharge that is stormflow by dividing the stormflow volume by the sum of baseflow and stormflow volume.
14. Fill out the following table, using the data from Ridgewood Road and your data/calculations or the Data Analysis Assignment key for the hydrograph on Pleasant Valley Road. Please recreate the table with sufficient space for the answer to the final question and turn in a typed assignment in class.

	@ Pleasant Valley Road	@Ridgewood Road
What is the peak discharge on 11/12/2012?		
What time is the peak discharge on 11/12/2012?		
What is the total stormflow for this event?		
What is the total baseflow for this event?		
What percent of the discharge (stormflow + baseflow) is stormflow?		
Discuss what differences you observe between the two hydrographs and *why* think they may occur. Be sure to include each of the variables above.		

Option B: Stormwater management scavenger hunt

Find examples of ***two different types of stormwater control measures (SCM)*** from the list below. These examples can either be photos of sites that you've seen here in northeastern Ohio or they can be pictures taken from the web, if you can find sufficient accompanying information. For each SCM, include the following information:

1. Photo of the SCM
2. Description of where it is located (at least city and state) and what the surrounding land use is like (use visual clues in picture, too).
3. A paragraph on how the SCM is designed to function, what type of sites that SCM is appropriate for, and any particular or interesting siting and design consideration. There are many websites to look at for this information, but a good place to look is the factsheets on http://www.stormwatercenter.net (look for the purple link to "assorted fact sheets" and scroll down to stormwater management practices)

Types of SCMs:

Porous pavement
Infiltration basin
Infiltration trench
Bioretention
Grassed filter strip
Sand and organic filter

Grassed channel (swale)
On-lot treatment
Wetlands
Dry extended detention pond
Wet pond