Preparation for the Flood-Water Runoff Modeling Lab
Earth Science Extras
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Imbedded toward the middle of the surface hydrology interactive text is a lab-like activity that requires the use of an Excel spreadsheet. You will need access to Excel to complete the activity. If you are familiar with the use of spreadsheets, you might not need this primer, but I am giving below a few hints about how to use the spreadsheets to solve the problems in <u>flood-water runoff modeling</u>

Flood-water runoff modeling:
This exercise has you play with a spreadsheet-based numerical model that is already put together for you and, based on published research, makes predictions about flooding based on measureable quantities such as average slope, type of soil and ground cover, amount and duration of rainfall, size of drainage basin, etc. There are a lot of calculated values in this spreadsheet, but you are only interested in the <u>input values</u> (which you can change to see how those variables affect the outcome) and the <u>output values</u> (various flood parameters).

The input values, those values you can change, are the following:

|					square miles		
Input:		P=rainfall (inches)	CN=Curve Number	D=Duration of rain (hours)	a=area of basin	Y=average slope (percent)	
		4	95	2	4	3	

The Curve Number (CN) captures various aspects of soil type and ground cover and can take on values between 0 and 100. Some example values for you to play with are at the bottom of the spreadsheet and reproduced here:

Selected CN Values (for good hydrologic conditions):			
	Sandy Soil	Clay-rich Soil	
Straight row small grain crops	65	88	
Woodlands	25	77	
Urban: Commercial and busines	89	95	

The output values, those values you are interested in that change based on your input values, are the following:

	runoff (inches)	runoff (cubic feet)	Peak runoff rate (cfs)	time until peak runoff (hours)	time until normal (hours)
output values	3.431078	31884319	2928.106	2.268554	6.05704

There is an additional tool to help you visualize the output results, and that is a graph that shows the results, including the rainfall amount and duration, time and discharge at peak runoff and the time back to normal runoff. The graph provides a default comparison curve (woodland clay runoff with a default slope) as well as the curve for the conditions that you input under "input values." An example graph is shown below. To answer the questions in the interactive text, you need to figure out what this graph is showing you for various input values.
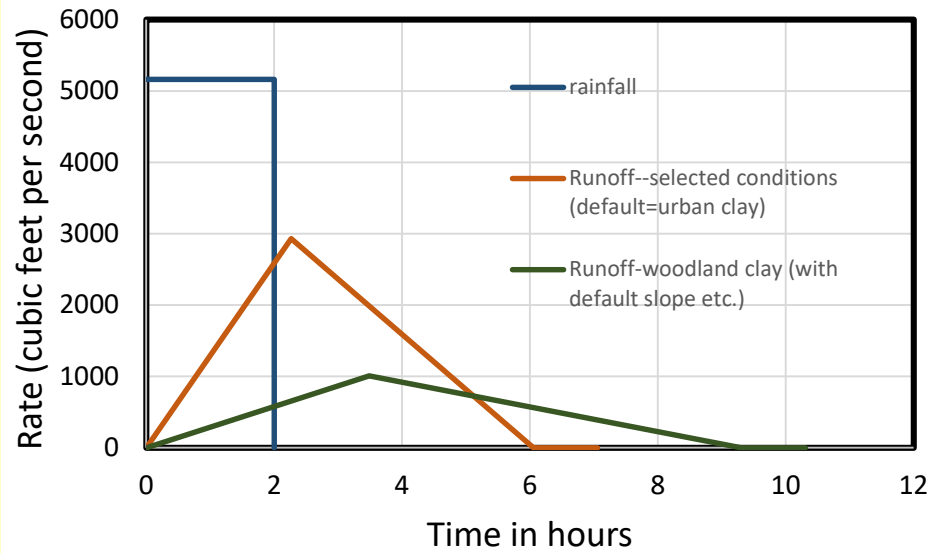
Note: Although it does not affect your ability to interpret the graph above, or figure out the exercises in this lesson, in this spreadsheet, the letter "Q" does not mean discharge as often does in reference to ground and surface water.

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