**Catchment Hydrology**

**Lab 11**

Purpose:

For the duration of the semester, we have worked through several data analyses and problems using the programming language R and the plotting package ggplot2. This final, capstone lab exercise is intended to test your ability to visualize data and address questions using those skills and drawing on the material we discussed in class. For the first time in the semester, you will not be provided with shell code, but will need to start from scratch.

Things to remember:

* Everything you need to know how to do is on the base R and ggplot2 cheat sheets and USGS data retrieval package documentation.
* You have done all of this before. Use your code from previous labs.
* Be methodical and careful about troubleshooting your code. Some questions to ask yourself if you get stuck: (USE THIS)
  + Are the correct libraries loaded?
  + Does the data I am trying to plot/manipulate exist? When in doubt print it out.
  + Check capitalization and spelling of variables
  + Check parentheses
  + Check for “+” at the end of ggplot commands
  + Are my variables the correct type? (numeric vs factor, etc)
  + Are commas in the right places in function calls?

Assignment:

Use the USGS data retrieval package to get discharge and specific conductance values for a gage of your choosing. (Note: you can’t choose just any gage, as not all have SC) Download enough of the record to show at least three storm events. Once you have the data, do the following:

Make 2 plots:

A two-panel plot with one panel showing discharge and one showing SC

A plot showing SC v. Discharge

Use these plots to answer the following questions.

* 1. What is specific conductance and what does it tell us?
  2. Describe the relationships you see between SC and Q in your timeseries plot. How is this indicative of the type of watershed this gage measures? Look up information on the watershed to see if this makes sense. If it doesn’t: explain why.
  3. Describe the general relationship in the SC v. Q plot. What does this plot show you that the time-series one does not? What is the utility in looking at these data this way? Describe the relationship.

**Turn in a PDF with your clearly labelled plots and answers to the questions. Include your code as an appendix.**