

**GLY 410 Hydrogeology – USGS Station/Discharge Measurements
and Storm Hydrograph Analysis**
[Due Date, Wednesday, November 1 at 4pm.](#)

Step 1: View of Gauging Station at Tioghnioiga River

USGS Gauging Station gives automated download data per river stage, discharge and flood levels available on the web. Look up the web site and find the pertinent information on the Tioghnioiga Rivers:

<http://waterdata.usgs.gov/ny/nwis/uv?01509000>

Task 1: Discuss the stage and discharge of the river as you find it both today and over the period until this report is due. Copy and paste a picture of the discharge record for the period October 10-23. Discuss its flow and how it might relate to rain events.

Step 2: Dilution Gauging: Hoxie Gorge Creek Tracer Test

We will use a conservative tracer to allow a plume of salt to dilute down the creek.

Task 2: Using the Excel spreadsheet data I have provided both in class and via your email, plot the electrical conductivity of the stream with time as the plume flows by our observation point. What does this tell you about the “time of travel” of the stream? This should all be done by using the “chart” and plotting functions in Excel. Data for this task is found on the first worksheet found in the file labeled “Tracer Expt.” If you do not know how to manipulate data and use formulas in an Excel Spreadsheet, this is your opportunity to learn.

Step 3: Current Meter Measurement.

The class record stream width, the depth at each point measured, and the mean velocity at 0.6x the depth at that point, across the stream, for both dates 10/10 and 10/17.

Task 3: Draw a diagram of the stream profiles found on the Excel spreadsheet I have provided (on the worksheet in the spreadsheet labeled “Stream Gauging Data.”). Then, calculate total discharge (Q) in m^3/sec , and in Liters/second, using the MS Excel spreadsheet. There are four total sets of data on this worksheet, two for each day we observed, and the data is found in the worksheet labeled “Stream Gauging Data” on the spreadsheet. You should show all of your calculations in the spreadsheet and in your formal lab report (described at the end of this page).

Step 4: Hydrograph Separation Exercise:

On the third worksheet found in the spreadsheet (labeled “Storm Hydrograph Data”) you are given data for streamflow (Q_T), and chloride (Cl^-) concentrations for the stream water, rain water and the groundwater from a well near the stream channel.

Task 4: Using the streamflow and Cl^- data shown in the spreadsheet under the worksheet tab “Storm Hydrograph Data,” and the method for chemical hydrograph separation we discussed in class in the slides on “Hydrograph Analysis,” you are to create a plot which shows a storm hydrograph for this storm, with Q vs. time. You are also to show a second hydrograph, on the same plot, which shows the proportion the total amount of “old water,” or pre-event (p) water, which is part of the stream hydrograph, at each point. So you should have one hydrograph of total Q , and another under it which is the hydrograph due to pre-event water. You will need to calculate the fraction of old to total Q at each point in the hydrograph, using methods we have described in class.

You are to hand in to me on Wednesday, November 1, by 4pm, an electronic spreadsheet with all of your charts and calculations, as well as a report which outlines Tasks 1-4 on this instruction sheet. This is expected to be a formal lab report with a description of how you accomplished all of your tasks, along with the specific results of those tasks (chart, hydrograph plot, etc.).

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