

Stream Flood Predictions

EVS 248 Environmental Geology and Hydrology

Fall Semester

This lab is intended to introduce you to the concept of flood risk and its calculations, building on the the statistical insight you have gained in class. You may have heard the term *100-year flood* previously. In this exercise, we'll see what it means and where its estimate comes from. We're going to do the first exercise together in class. The procedure is as follows:

1. To be completed together:
 - Collect data. The USGS has gauging stations all over the U.S. that record the water level (stage) in streams. For each stage, a corresponding discharge (Q, volume per time) is estimated for that particular gauging station. This data is generally uploaded to the internet daily and available for free. For this first exercise, I'll provide the data.
 - Determine the maximum Q for each year on record. (Let N be the number of years.)
 - Rank the years from 1 to N, with 1 being the greatest discharge. (Let M be the rank.)
 - Calculate the recurrence interval, $\frac{(N+1)}{M}$. The *exceedence probability* (p) is the reciprocal, $\frac{M}{(N+1)}$.
 - Plot Q versus p on log-probability paper (available on web site.)
 - Use the curve to make predictions. What is the 100-year flood for the data set?
2. To be completed on your own:
 - Locate data on the web for discharge of the Grant River at Burton WI.
 - Download the data in the format that we used in the previous exercise, with year and yearly peak flow in two columns. You may have to massage the data in Excel to get it into the needed format.
 - Calculate the 100-year flood.
3. Please submit online your estimate of the 100-year flood. I'll examine your graph in class.