Physical **H**ydrology for **E**cosystems
BEE 3710

Assignment#8 Soil Water Balance and Watershed Modeling I (due 4/5)

There are three distinct objectives to this assignment: (1) to gain perspective on how Northeastern U.S. soil moisture varies seasonally; (2) to get a little experience modeling a watershed; and (3) and to tie together several of the processes that we have discussed this semester.

I have provided several years of weather data (including snow melt) in a file available at the class website. Use the Thornthwaite-Mather-based model we used in class to simulate monthly stream discharge for Sixmile Creek and see how closely you can match the observed discharge; the variables you can adjust are: initial soil available water, initial "storage" (think groundwater), available water capacity, and the linear reservoir coefficient (the fraction of storage that goes the stream each month).

Questions:

- What is your average annual actual ET and how does it compare to previous estimates from this semester? Compare it to the average annual PET Make a graph of precipitation, PET, and actual ET (on the same graph) and note the parts of the year where there is a deficit in the soil water budget (more PET than precipitation)
- In which month is the soil, on average, the driest? How dry? Turn in a graph of monthly available water, precipitation, and PET.
- Attach a graph of modeled streamflow (represented with a line) and observed stream flow (represented with symbols and no line). How well did your "modeled" streamflow match the observed streamflow? Note some specific problem months and hypothesize on the discrepancies. What were the values for the key variables that you used.

Extra Credit: Make a daily model for Sixmile Creek and see how closely you can get your model to fit the observed stream discharge. What month(s) experience the highest overland flow? Based on your results, when does groundwater recharge mostly occur? Graph daily precipitation, ET, available soil water, and runoff (overland flow). Feel free to see me if you want help with this.