FCR Time Series Model Workflow  
WW, 2018

A linear description of what I’ve done on this project

* Step 1
  + **Create** “**layers**” of CTD data
    - Using sampling depths for water chemistry, take the nearest depth in CTD data (abs value) and use that value for all other variables (e.g., temp, conductivity, etc.)
    - Replace CTD depth with the sampling depth to create “layers” (e.g., 0.1m, 0.8m, etc.)
  + R File: 1\_FCR\_CTDlayers\_Site50\_ONLY\_replacedepth
* Step 2
  + **Summarize** meteorological data on a daily basis
    - Calculate summary statistics (mean, median, sum, etc.) for meteorological data to go from hourly met data to daily statistics
  + R File: 2\_summarize\_daily\_met\_TIDY
* Step 3
  + **Calculate** specific conductance for all CTD data at site 50 and remove CTD-generated specific conductance
  + R File: 3\_calculate\_spcond\_CTD
* Step 4
  + **Format** fluoroprobe data
    - Pull out only relevant columns from 2017 data
    - Put 2014-2017 data together
    - Create “layers” and replace with proper depth labels
  + File created: Fluoro\_FCR50\_2014\_2017.csv
  + R File: 4\_format\_fluora
* Step 5
  + **Calculate** light extinction coefficient
  + File created: FCR\_kd.csv
  + R File: 5\_calculate\_Kd.R
* Step 6
  + **Merge** together FCR data sources
    - Pull together all important data sets with some small formatting before merging to make sure everything will align properly
      * TP/TN and NH4/NO3NO2 ratio columns created
      * New columns for inflow chem data created
    - File created: FCR\_Master\_2013\_2017.csv
    - R File: 6\_merge\_FCR\_data.R
* Step 7
  + **Plot** at the data!
  + R File: 7\_plot\_fun.R
* Step 8
  + Determine the **timestep** of the chlorophyll data we have
    - Looking at how the data fall within weekly divisions each year and visually determining what days need to be interpolated
* Step 9
  + **Interpolate** CTD for weeks that were not sampled from the May 01-Oct 31 time frame
  + R file: 9\_interpolate\_CTDdata.R
  + File created: CTD\_interpolated.csv
* Step 10
  + Using **inflow** data, calculate
    - mean daily nutrients loads
    - mean daily residence time
    - mean daily water temperature at inflow (should this also include max and min??)
    - mean, min, max, and median flow (m3/s)
  + R file: 10\_inflow.R
  + File created: inflow\_loads\_wrt.csv
* Step 11
  + Re-merge together data that was collected by VT and will need to be interpolated (i.e., no meteorological data)
    - CTD data
      * Remove CTD-calculated specific conductance and keep calculated specific conductance
      * Nutrient chemistry at Site 50
      * Nutrient chemistry at inflow
      * Kd, light extinction coefficient
      * Fluoroprobe data
      * Inflow data (see step 10)
  + R file: 11\_merge\_FCR\_data\_round2.R
  + File created: FCR\_VT\_data\_2013\_2017.csv
* Step 12
  + Interpolate all of the data that was collected from 2013 to 2016
    - Chl
    - Temp
* Step 13
  + Randomly select one datapoint per week for weeks where there is more than one so that dataset has **one datapoint per week**
    - 2017 CTD has missing data for chlorophyll so this will be dealt with in the future
* Step 13
  + Merge together interpolated, weekly dataset and meteorological data
    - What about a time lag?