

# Assignment 5: Data Visualization

Student Name

Spring 2023

## OVERVIEW

This exercise accompanies the lessons in Environmental Data Analytics on Data Visualization

## Directions

1. Rename this file `<FirstLast>_A05_DataVisualization.Rmd` (replacing `<FirstLast>` with your first and last name).
  2. Change “Student Name” on line 3 (above) with your name.
  3. Work through the steps, **creating code and output** that fulfill each instruction.
  4. Be sure your code is tidy; use line breaks to ensure your code fits in the knitted output.
  5. Be sure to **answer the questions** in this assignment document.
  6. When you have completed the assignment, **Knit** the text and code into a single PDF file.
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## Set up your session

1. Set up your session. Load the tidyverse, lubridate, here & cowplot packages, and verify your home directory. Upload the NTL-LTER processed data files for nutrients and chemistry/physics for Peter and Paul Lakes (use the tidy NTL-LTER\_Lake\_Chemistry\_Nutrients\_PeterPaul\_Processed.csv version) and the processed data file for the Niwot Ridge litter dataset (use the NEON\_NIWO\_Litter\_mass\_trap\_Processed.csv version).
2. Make sure R is reading dates as date format; if not change the format to date.

#1

#2

## Define your theme

3. Build a theme and set it as your default theme. Customize the look of at least two of the following:
  - Plot background
  - Plot title
  - Axis labels
  - Axis ticks/gridlines

- Legend

#3

## Create graphs

For numbers 4-7, create ggplot graphs and adjust aesthetics to follow best practices for data visualization. Ensure your theme, color palettes, axes, and additional aesthetics are edited accordingly.

4. [NTL-LTER] Plot total phosphorus (`tp_ug`) by phosphate (`po4`), with separate aesthetics for Peter and Paul lakes. Add a line of best fit and color it black. Adjust your axes to hide extreme values (hint: change the limits using `xlim()` and/or `ylim()`).

#4

5. [NTL-LTER] Make three separate boxplots of (a) temperature, (b) TP, and (c) TN, with month as the x axis and lake as a color aesthetic. Then, create a cowplot that combines the three graphs. Make sure that only one legend is present and that graph axes are aligned.

Tip: R has a built-in variable called `month.abb` that returns a list of months; see <https://r-lang.com/month-abb-in-r-with-example>

#5

Question: What do you observe about the variables of interest over seasons and between lakes?

Answer:

6. [Niwot Ridge] Plot a subset of the litter dataset by displaying only the “Needles” functional group. Plot the dry mass of needle litter by date and separate by NLCD class with a color aesthetic. (no need to adjust the name of each land use)
7. [Niwot Ridge] Now, plot the same plot but with NLCD classes separated into three facets rather than separated by color.

#6

#7

Question: Which of these plots (6 vs. 7) do you think is more effective, and why?

Answer: