Research Goal #2 Background:

My research project concerns the effects of beaver activity in the Pole Mountain section of Medicine Bow National Forest. This research builds off of the research done by Matt Hayes, which mapped beaver ponds in different stages (the categories are listed below) across the research area mentioned above. I have two research goals for this project. The first goal is to determine the organic carbon spiraling length ($S$) above and below a beaver pond over several months. The second goal is to characterize the storage and flow of carbon (C) and nitrogen (N) in riparian areas affected by beaver activity. At one time, the North American beaver (Castor canadensis) population covered a large area of the continent. Over-hunting led to the near extinction of beavers, with populations only recently recovering due to effective protection and reintroductions. This increase in population and distribution of a species that can modify ecosystems has generated scientific interest, along with a possibility for land-use conflicts. This results in the need for better understanding of the impact of beaver activity on ecosystems. Studies have found that beaver dams effectively trap sediment, reduce streambed erosion, provide water storage, control water table levels, regulate flow, and create wetlands which are home to a wide variety of species.

Research Goal #2 Methods:

1. Beaver pond categories:
   a. Gained ponds between 2001 and 2009 (Gain)
   b. Long term ponds (Long)
   c. Lost ponds, where the dam failed and was abandoned, between 2001 and 2009 (Lost)

2. Sampling locations:
   a. Gain
   b. Long
   c. Lost
   d. Pond where $S$ was measured
3. Samples collected at each location:
   a. Upland slopes on each side of the riparian area (Upland A and Upland B)
   b. Wetland
   c. Pond (sediment samples)

4. Data needed:
   a. Soil sample depth and location
   b. Landscape information (vegetation, boulders, slope, aspect, etc.)
   c. Carbon and nitrogen concentrations of soil sample

5. Equipment:
   a. GPS
   b. Soil probes
   c. Soil sample worksheets
   d. Pre-weighed T0 cups with K₂SO₄
   e. Cooler

**Data:**

I am currently doing lab work to analyze my samples. I am determining the concentrations of several different types of C and N for each sample. I haven’t organized all of the data I have collected so far. So, I generated fake data to use with my code for now. I only used one type of C and N for this project to keep things from getting too complicated, but I will be able to easily adjust the code to work with all of the data. The data used in this project is shown on the next page.
I decided to focus on graphing this data. There is a lot going on in this part of my research project, and I wanted to try to display it in a way that makes sense. I used grid and gridBase to combine use of viewports and barplot(). Even though all of my figures are printed to pdf, I included oldpar in case I, or anyone else, wants to graph something to the viewer in RStudio and then wants to restore the original par() parameters. The graphs are on the next page.