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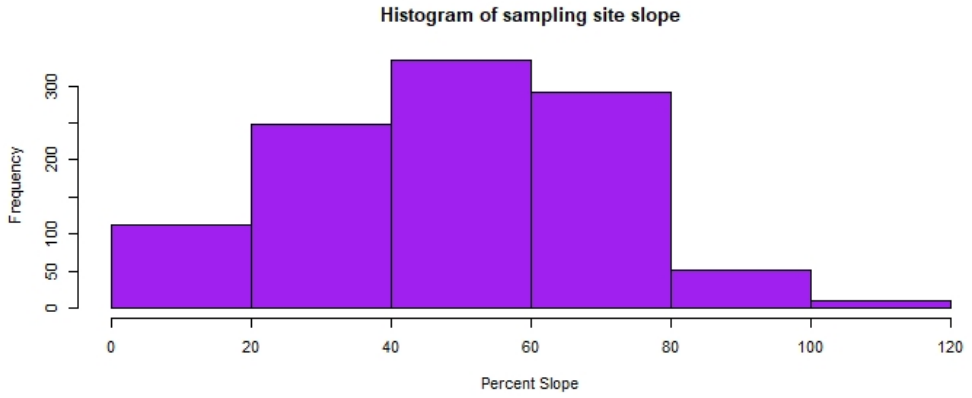
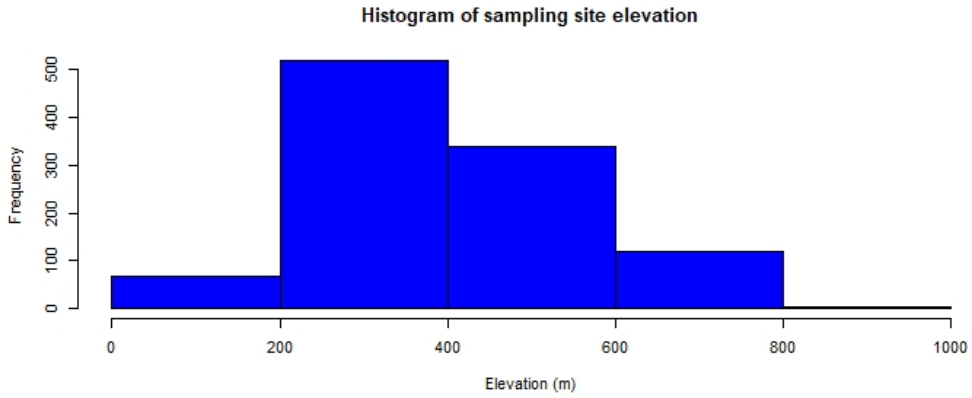
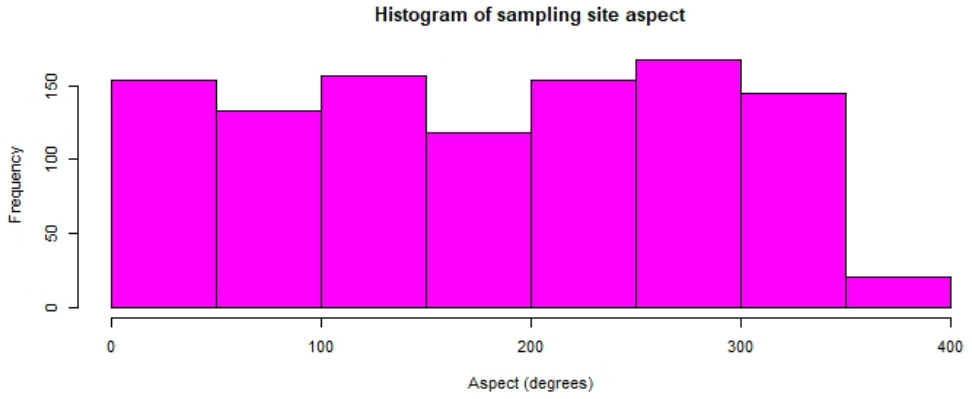
Eco 602 – Individual/Group Data Exploration + Deterministic Functions

9/15/2021

Q1. Histograms from Hab.sta.csv for Slope, Elevation, and Aspect







Q2. Elevation Histogram Interpretation:

The full range of elevation values for observed sampling sites is 85-872 meters. This is a very broad range for elevation values. However, it appears the histogram depicts most of those elevation values fall in the range of 200-400 meters, followed by the range of 400-600 m. Therefore, most of the elevations appear to be at lower and middle elevations (i.e. 200-400m range).

There is not an even distribution of sampling site elevation according to the histogram. If there were an even distribution, the histogram bars would all be at the same level of frequency. In this case, the frequencies for each elevation 'bin' are very different, with the 200-400m category occurring the most frequent, occurring in observations about 500 times. The elevation range of 400-600 m was observed approximately 350 times in comparison. This histogram could be broken up into smaller bins to see exactly which smaller elevation range is most frequent and perhaps seen as the most optimal sampling site elevation. The histogram plotted above for elevation is simply a rough estimate of the most frequent elevation range.

Q3. Units of slope in the Hab.sta.csv dataset are in percent slope (%). The values are numeric and can range from 0-110% slope. This information can be found in the metadata file associated with the habitat and bird data CSV files. The metadata is 'birds_metadata.pdf'.

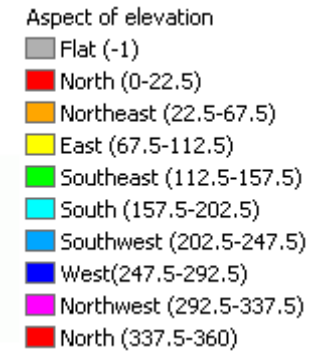
Q4. Slope Histogram Interpretation:

According to the histogram of sampling site slope, most sample sites were not observed on flat ground. Most sites had some sort of slope, with the most frequent range of percent slope values being 40-60%. That is a steep slope. The slope values in general are evenly distributed from the mean slope value of 50.3% slope. Therefore, there are an even mixture of steep and shallow slopes. Only the steepest 80-100% and 100-120% slope ranges are the least frequently occurring for sampling sites. This histogram demonstrates that sampling sites might be optimal in areas that are not flat and have some sort of slope to them. Although, it seems there might be a threshold value once you move beyond 80% slope that sampling sites are less optimal and less likely to occur at.

Q5. Briefly define aspect, describing the units used in this dataset:

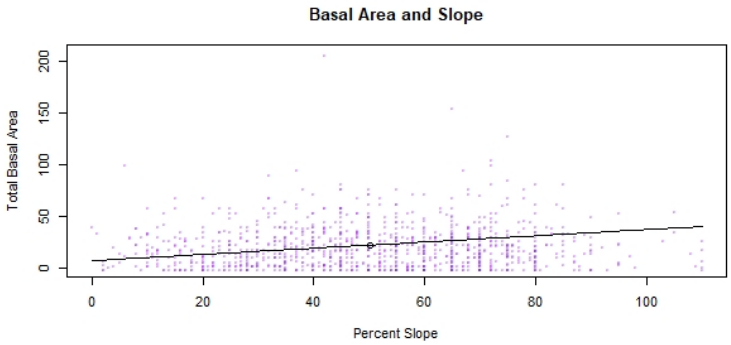
Aspect is the compass direction or azimuth that a terrain surface faces. The Hab.sta.csv metadata reports that Aspect for this dataset is in degrees and is numeric, ranging from 0-360 degrees. Aspect is usually measured in degrees from north, therefore 0 degrees represents a 'north-facing slope'. Aspect can also be generated from continuous elevation surfaces. As an example of Aspect, a slope which falls down to a deep valley on its western side (and has a shallower slope on its eastern side) has a 'westerly aspect' or is a west-facing slope.

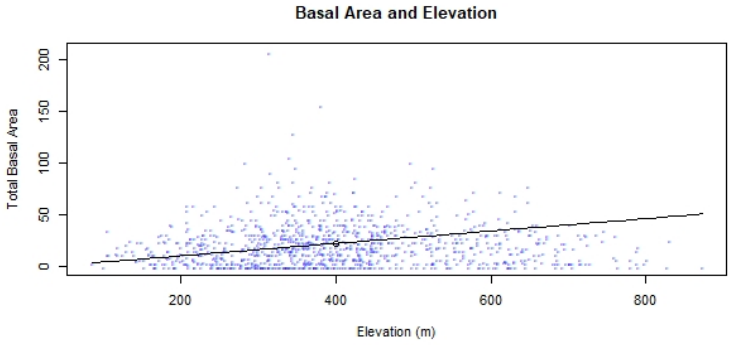
Q6. Aspect Histogram Interpretation:

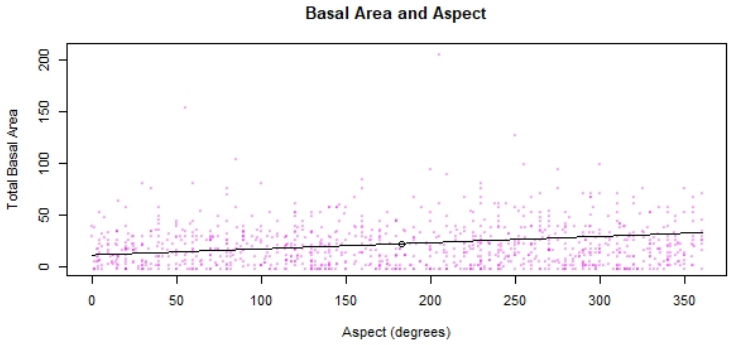


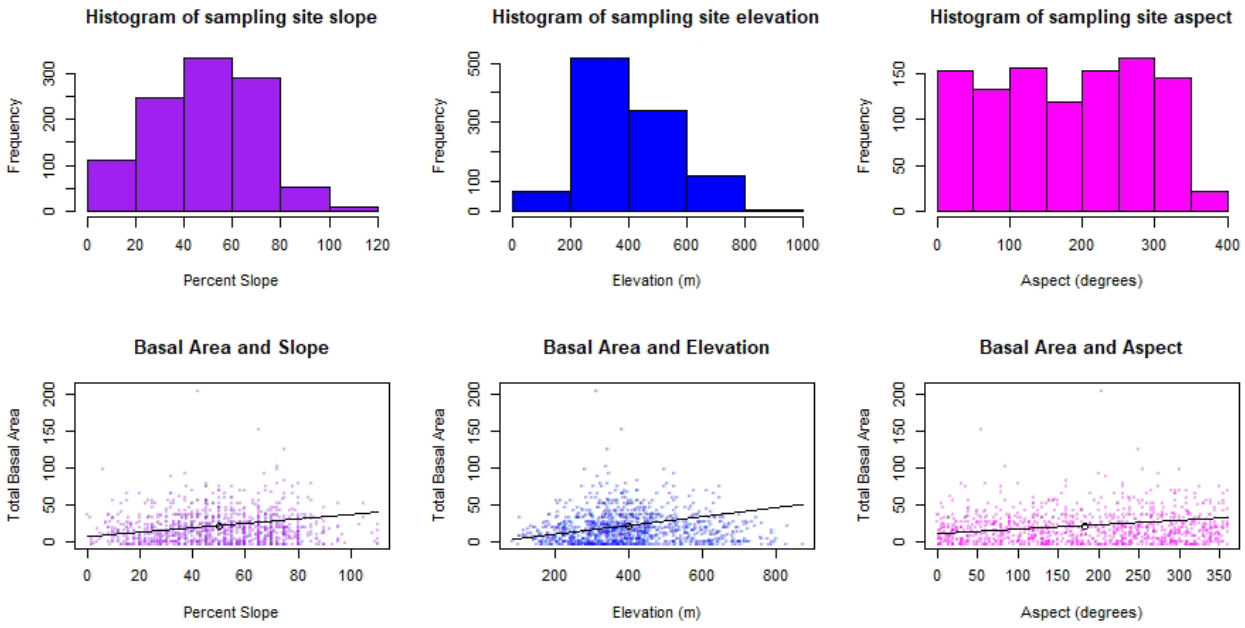
According to the classification of aspect degree values on the left, the most frequently occurring aspect the sampling sites tend to be on is west-facing slopes (from 250-300 degrees). But this is also followed directly by frequent sampling sites on southeast, north, northwest, and northwest facing slopes. Since the aspect categories are so evenly distributed based on the observations, it is hard to tell if more sampling sites generally tend to be on either north or south facing slopes. Perhaps there is not really a preference for aspect for sampling site location. Further data exploration and statistics should be performed to determine whether aspect plays a driving role in selection of sampling site.

Q7. Scatterplots of Basal Area vs. Topography variables in Habitat Data









Q8. Elevation vs. Basal Area

There doesn't seem to be a very clear relationship between basal area and any of the topographic parameters observed. In comparing elevation and basal area, we can't observe a clear positive or negative relationship. I think it could go either way. There are several outlier data points with very high basal areas and low to middle range elevation values. The linear trend I drew on the plot exhibits a positive slope, however, I can envision a negative slope also fitting this data. It might make more sense to have a negative linear trend, as basal area would decrease with higher elevations, potentially due to lower temperatures and shorter growing seasons at higher elevations. I would not say that the linear model is a good fit for this data. Perhaps multiple topographic variables in combination would better correlate to basal area.

Slope vs. Basal Area

It appears there may be a slight positive relationship between basal area and slope. As the percent slope increase, the total basal area increases. However, the range of basal area seems small as compared to the range of slopes, and the data plotted appear to be very flat. There is not really a clear association between basal area and slope either. I would say maybe this slightly positive slope linear model may be a good fit for the data since at this point I am not sure what other type of model might fit this better (i.e. exponential, polynomial, etc.). Perhaps, as I stated before, a combination of these topographic parameters in a linear function might illustrate a better association with basal area.

Aspect vs. Basal Area

Again, no clear association with basal area and aspect. Of the three topographic parameters, this plot's data appears to be the flattest. Basically, this signifies that in the data observations there is a pretty even distribution of basal area values across all aspects. There are also some outliers with very high basal areas, but no significant trend is indicated by this plot. I would not say this linear model is a good fit for this data. (Also I worked mainly alone on this assignment, Matt helped brainstorm some things)