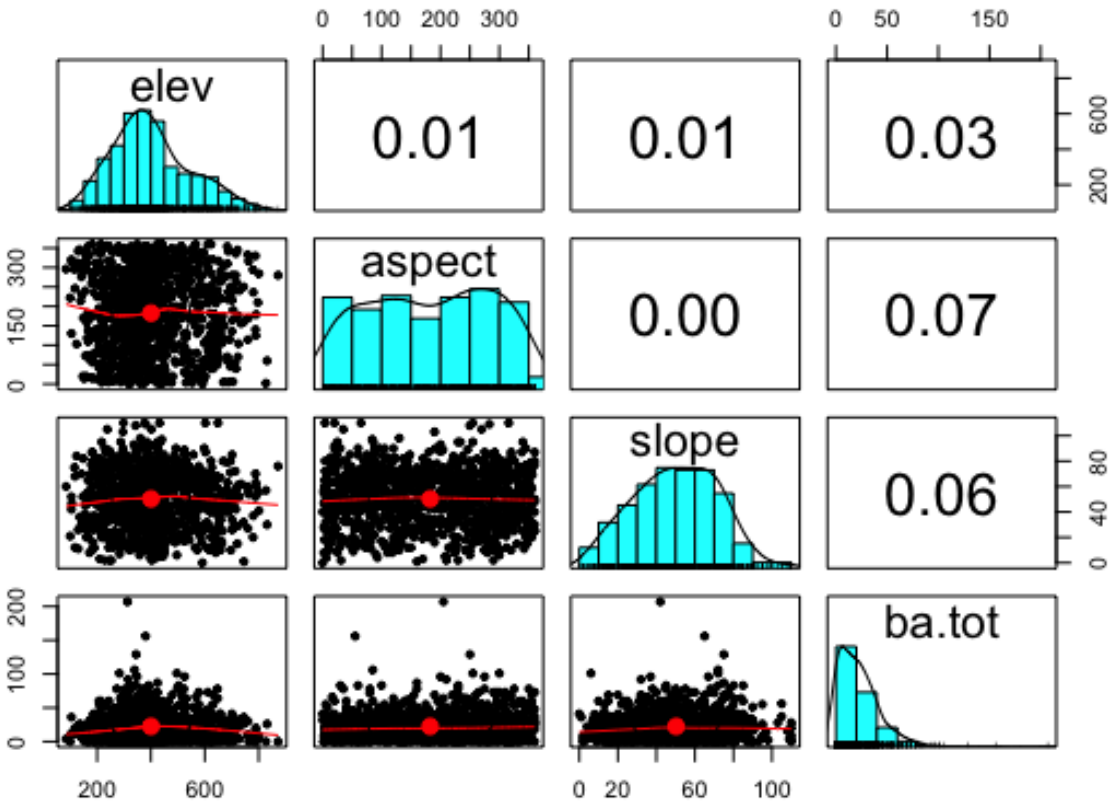
Jessica Bonin
Analysis of Environmental Data
Lab 3 Report
September 26, 2021
Worked with Juliana Berube, Julia Vineyard, Andrew Gordon

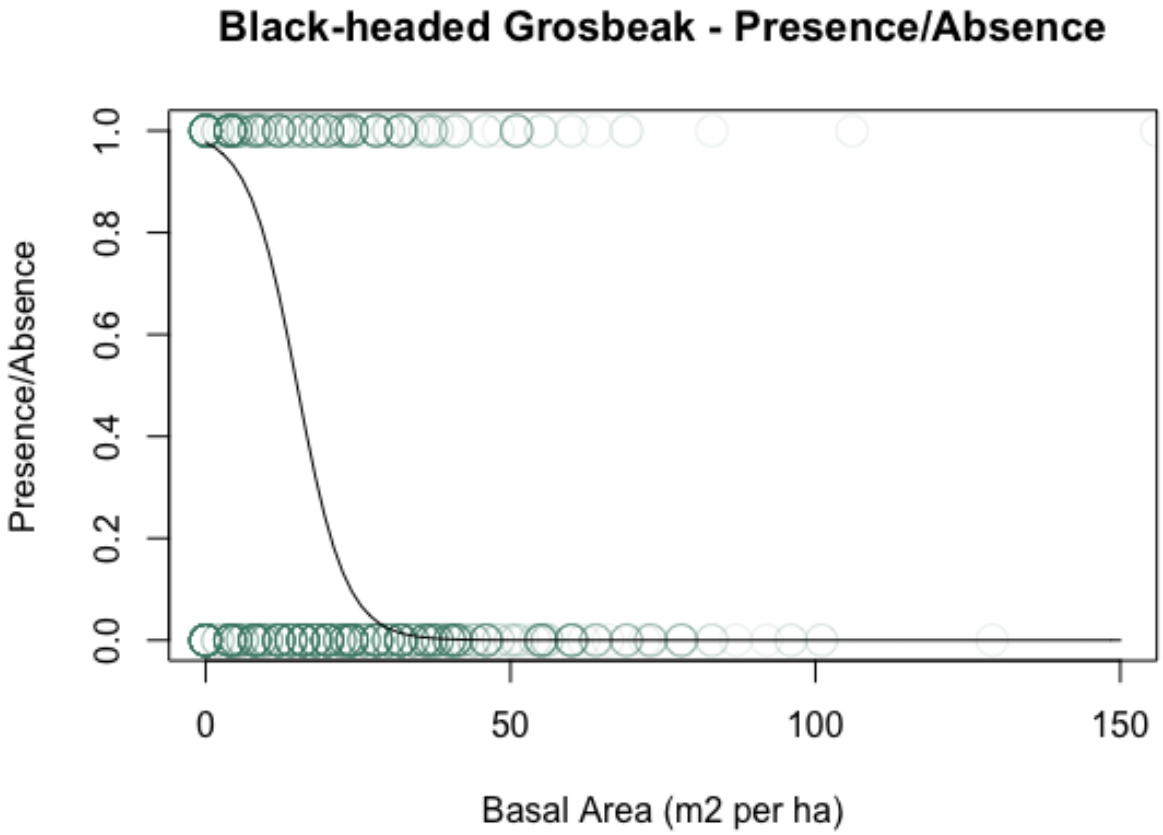
1. What is basal area, and how is it measured?

Basal area is the area of a cross section of a tree at breast height. It is measured in meters squared per hectare. It helps us evaluate forest cover.

2. Include a figure of your terrain/basal area pairplots.



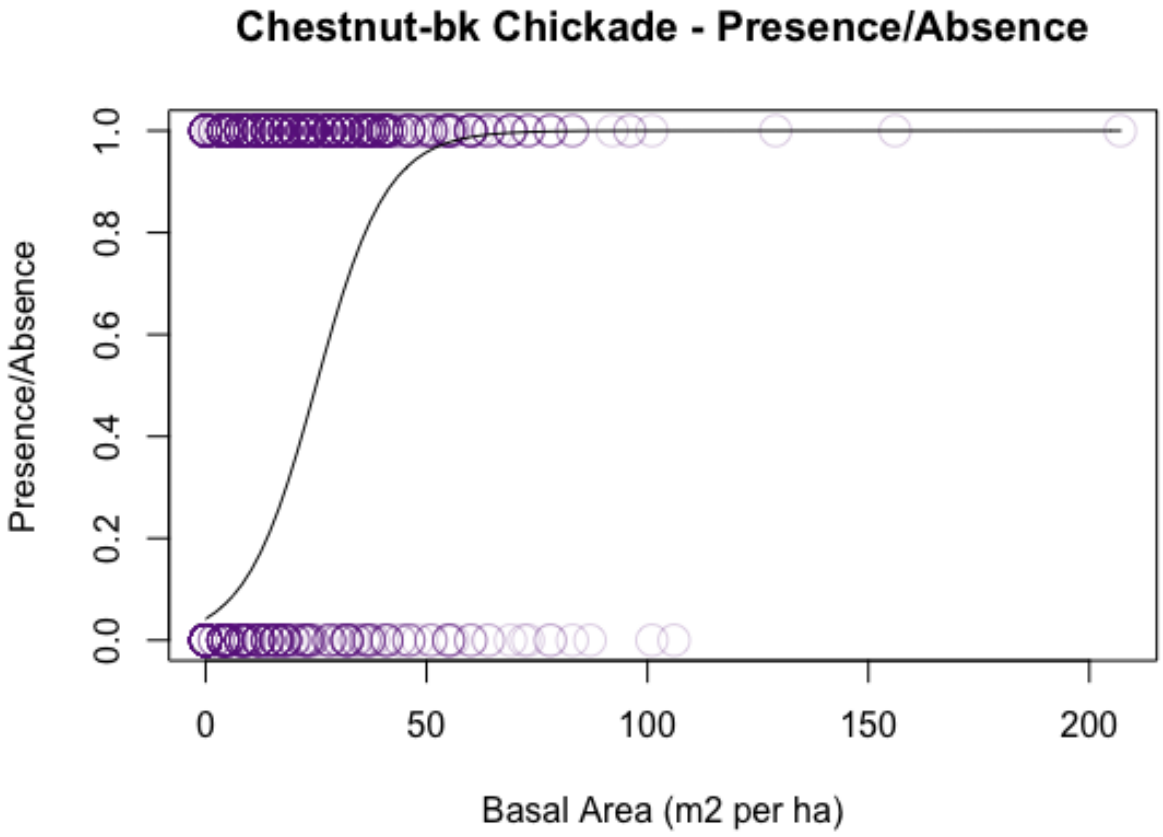
3. Include a figure of your logistic function plot. Your figure must include the name of the bird species, appropriate title, axes, etc.



4. Qualitatively describe the bird's presence/absence patterns in terms of basal area.

The model represents presence as 1 and absence as 0. Black-headed Grosbeak seem to be present in areas of low basal area. There were more sites sampled that did not have birds than sites that did. The data shows more points for absence (0) than presence (1). The majority of present birds occur in areas with a basal area between 0 and ~40 m^2 per ha. You can see that the lower the basal area (tree cover), the higher density of birds. This is shown because the data is much more concentrated for presence data on the far left. This could mean that they prefer areas of low forest cover. The logistic model is not a good fit to represent this data. While there is a noticeable trend that these birds are present in areas of low basal area, there is no adverse trend for absence data. For this reason, the data doesn't fit well within the logistic model.

5. Include a figure of your logistic function plot. Your figure must include the name of the bird species, appropriate title, axes, etc.



6. Qualitatively describe the bird's presence/absence patterns in terms of basal area.

The model represents presence as 1 and absence as 0. Chestnut Beaked Chickadees seem to be present throughout the whole range of forest cover sampled. The majority of present birds occur in areas with a basal area between 0 and 50 m^2 per ha with a decent amount occurring up to ~75 m^2 per ha. You can see that more sites had birds than did not. This is shown because the data shows many more points for presence (1) than absence (0). This could mean that they are tolerant birds with little preference for forest cover. I think the logistic model is insightful to visualize, but I don't think it is a good fit to solely represent this data. This is because there is not a drastic enough trend to express at which basal area there is a change in presence or absence, meaning the data does not fit the logistic model very well.

7. How many **total number of Gray Jays** were observed in all of the sampling sites.

181

8. Include the R code you used to perform the calculation.

```
sum(dat_all$GRJA)
```

9. Calculate the **total number of sampling sites** in which Gray Jays were observed.

110

10. Include the R code you used to perform the presence/absence calculation.

```
grja_present_absent = as.numeric(dat_all$GRJA > 0)
grja_present_absent
sum(grja_present_absent)
```