

Analysis of Environmental Data

Lab 03: Data Exploration and Deterministic Functions

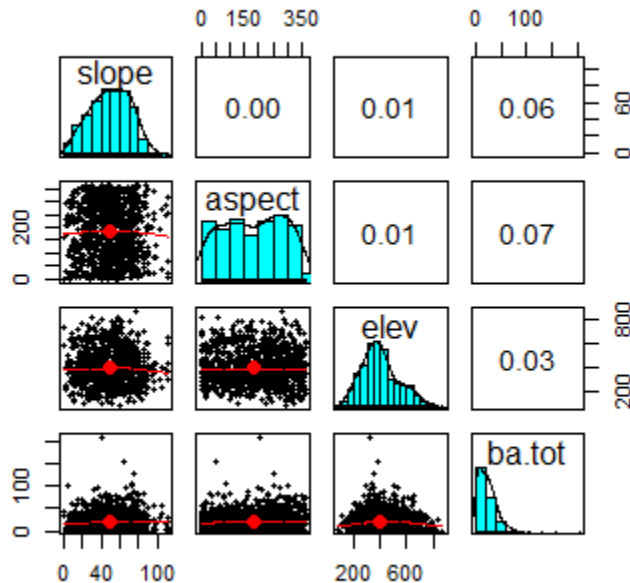
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Basal area

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

Basal area is an indication of tree cover, and it is usually measured per hectare or per acre for a given examined landscape. Hypothetically if you were to cut down the trees to stumps, measure the top of each stump, add the stump area sums together and then divide them by square feet or meters that would be the basal area for that one examined hectare or acre. If there are larger trucks, there will be presumably a higher tree cover. Basal area in the data used for this lab is measured by meters squared per hectare.

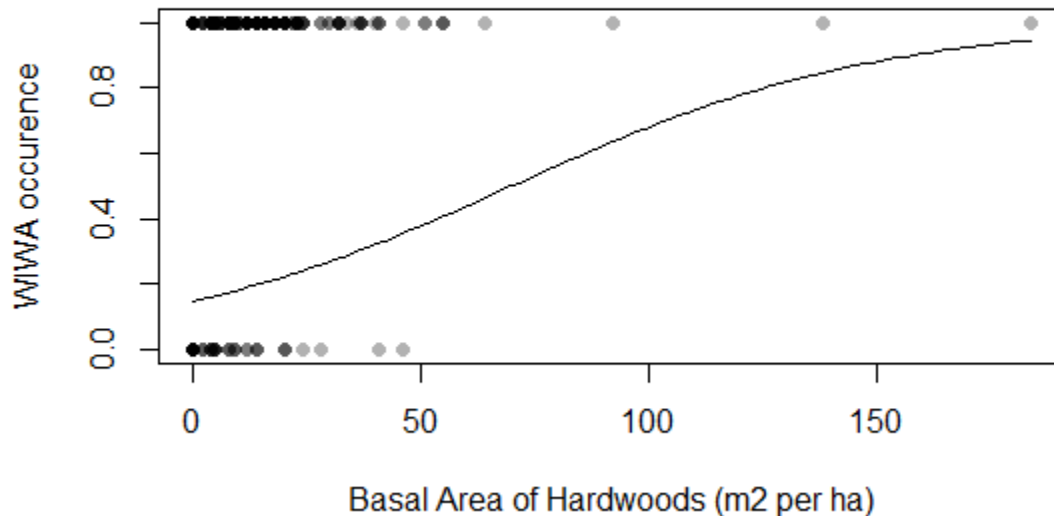
2. Include a figure of your terrain/basal area pairplot.



Bird Species 1

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

Wilson's Warbler presence vs. Basal Area of Hardwoods

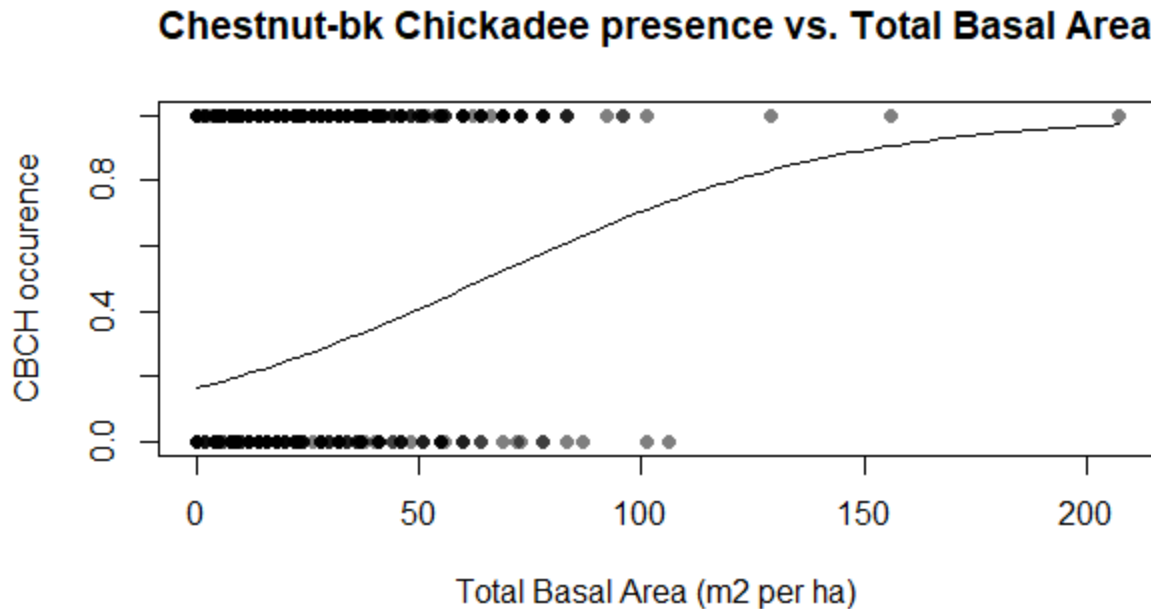


4. Qualitatively describe the bird's presence/absence patterns in terms of basal area (or your other chosen predictor). Your answer should make reference to your fitted logistic model plot. Some questions you might consider are:

From the logistic function plot above, presence of the Wilson's warbler seems to be aggregated around 0-50 m² per ha basal area of hardwoods, suggesting that they prefer areas with lower tree cover. When there is a basal area of hardwoods more than 50 m² per ha, occurrence of WIWA is sparse with a less aggregated pattern of presence points. Points of absence for WIWA is also clustered around a basal area of hardwoods of 50 m² per ha, with no more absence points present as basal area of hardwoods continues to increase. Overall, I would say that this logistic model is an ok fit for the data. The low tail of the curve is correct in predicting that the likelihood of WIWA occurrence being close to zero at a small Basal area of hardwoods, and the peak of the representative curve accounts for the outlier presence points at a higher basal area of hardwoods. However, the clustered presence points at a basal area of hardwoods less than 10 m² per ha is not fit or represented by the curve.

Bird Species 2

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 (or your other chosen predictor). Your answer should make reference to your fitted logistic model plot. Some questions you might consider are:

Presence of Chestnut-bk Chickadee seems to be favorably clustered in areas with low total basal area. Given this notable pattern of aggregated presence points between a total basal area of 0 to around 100 m² per ha, it is inferable that this species prefers areas with low to moderately low tree cover. Similarly, to the Wilson's Warbler presence/absence plot, there are some outlier presence points in areas with a higher basal area. Absence points are also heavily clustered in areas with low to moderately low tree cover (within the total basal area range of 0 m² to ~ 80 m².) Overall, I think the logistic model seems like a pretty decent fit. Again, the pattern of high presence in areas with lower tree cover are not fit very well to the curve. The curve only really speaks correctly to likelihood of absence (especially in areas with low total basal area,) and the few outlier presence points in areas of higher total basal area. Likelihood of occurrence in lower tree cover areas is fit to be low even though there is a notable aggregation of presence point within this total basal area range.

Gray Jays

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

A total of 181 Gray Jays were observed in all of the sampling sites.

- 8. Show the R code you used to perform the calculation.**

I used the following code to perform the calculation:

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

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

Gray Jays were observed in 110 sampling sites.

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

I used the following code to perform the calculation:

```
sum(dat_all$GRJA>=1)
```