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Week 4 Reading Questions

1. For both models (abundance and presence/absence) identify: a. The predictor variables b. The data type/scale used for the predictor variable
   1. Abundance
      1. Predictor variable: Extent of late-successional forest
      2. The percent is a continuous variable, ratio scale.
   2. Presence/Absence:
      1. Predictor variable: Total basal area
      2. Total basal area is a continuous variable, ratio scale.
2. For both models identify: a. The response variable b. The data type/scale used for the response variable
   1. Abundance
      1. Response variable: Brown creeper abundance
      2. The abundance is a continuous variable, ratio scale.
   2. Presence/Absence
      1. Response variable: Brown Creeper occurrence
      2. The occurrence is a Boolean data which is a categorical data type and presence/absence is nominal.
3. For both models: How did the data type or scale influence or constrain the choice of model?

Boolean data constrains the choice of models as it is not able to be represented with a linear function. The continuous variable, ratio scale data leaves the majority of modeling methods available. You are able to use a histogram, boxplot, or scatterplot, as shown, to visualize the data.

1. The Ricker function works on the assumption that an individual’s ability to reproduce decreases with increasing density of the population. In McGarigal’s predator functional response data this model is mechanistic. The Ricker model fits well with the data, but there are other models that fit the data better. The fit of the mechanistic Ricker model would allow a manager of the population to understand that as the density of the larval salamander population increases, the number of salamander larvae killed increases. The basis of the model in environmental theory would also allow managers to take their findings and apply to other populations.

The phenomenological quadratic model also fits the predator functional response data well. McGarigal notes that it has a better fit than any of the mechanistic models. However, even with the great fit of the model you must give up the root in environmental theory. This means that while you can describe the data that you show well you are not able to make deductions about the overall environmental mechanism. This will limit managers in their ability to respond to a population, and even more so their ability to take what they observe in one population and apply it to another.