

## Week 4 Reading Questions

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Eco 602 Lecture

McGarigal presented two studies of Brown creepers:

- A model of Brown creeper abundance explained by late-successional forest percent.
- A model of Brown creeper presence/absence explained total basal area (a measure of tree cover).

### Question 1

- For both models (abundance and presence/absence) identify:
  - a. The predictor variable(s).
  - b. The data type/scale used for the *predictor* variable.

The predictor variable in the abundance model is the type of landscape. In the presence/absence model the predictor variable is the amount of tree cover. The data type/scale I would use is ordinal. There is a natural order in the models of what the birds would rank the habitats. The more that are there it would have a higher rank.

### Question 2

- For both models (abundance and presence/absence) identify:
  - a. The response variable.
  - b. The data type/scale used for the *response* variable.

The response variable is whether the bird is present or absence in the area when looking at the basal area model as well as the presence absence model. If the animals preferred the area, then their response would be to stay or if they did not, they would leave. The data type used for the response variable is nominal. Presence/absence is two categories with natural ranking/order.

### Question 3

For both models: How did the data type or scale influence or constrain the choice of model? To properly display the data, you have to pick the correct model, so the information is communicated effectively. The model will depend on the number/ type of variables. If the variables are discrete or continuous or if the data is qualitative or quantitative.

### Question 4

McGarigal presented a simulated example of density-dependent predator-prey interactions in which he fit several different models to the data.

Consider only the Ricker and quadratic models.

Some concepts to keep in mind:

- mechanistic vs. phenomenological
- goodness-of-fit
- previous knowledge of predator-prey interactions

1. What are the pros and cons of the Ricker model?

Pros: More flexible, good for phenomenological models, finite limits, doesn't show negative populations

Cons: has some fixed points, points can be unstable

2. What are the pros and cons of the quadratic model?

Pros: can use fractional power instead of only integers, flexible, can add power to adjust curve, scale and location

Cons: Have to restrict  $x$  values and impose conditions to avoid negative values (populations)