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ECO 602

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Weekly Reading Questions

I worked on these questions individually (indicated as instructed on moodle)

**Q1: Choose one of the modeling dichotomies that Bolker writes about in sections 1.1 - 1.3 (summarized in table 1.1 on page 6). In 1 - 2 short paragraphs, explain the dichotomy in your own words and briefly describe how you might approach one of your research interests from each of the dichotomy endpoints.**

I would say there are a couple of modeling dichotomies that I may have used to approach my current research, however the one that I am most familiar with is Pattern and Process. In my research, I am looking into the link between climate change and local invasive species. With pattern, I am looking at the spatial relationship between ecosystems: land structures, land use distribution, species distribution. For the process aspect, I am observing the interactions of these elements, such as the flow of energies, to establish connectivity, risk measures, and correlations to research possible protections and mitigation strategies. Also, the reading mentioned process variability which is something that I’ve experienced gathering data.

While looking for climate data is when I would say I experience environmental stochasticity, which is part of the process variability. This is because even though climate data has many new studies predicting long term effects, the data is still unpredictable and has several changes as newer studies arise. With demographic stochasticity, I find that with different sites and data sources, the number of the same species of invasives may vary a bit depending on the source.

**Q2: Identify at least one source of bias or assumption (cultural, scientific, other). Hypothesize a practical impact these biases or assumptions might have on scientific communication and the effectiveness of management efforts? (1 - 3 paragraphs)**

In the McGarigal slides, I think the bias and assumptions that I noticed most are scientific bias. In the first two testimony slides particularly it is easy for me to see; in the first testimony slide there is just a simple scatter plot and a statement of the results. To a committee of scientists, they will probably know how to interpret these results however even though they may know how to interpret it, it is still vague and will not warrant much reaction. I believe the assumption and bias presented here is that these are all scientists and because of that, the presented results did not need much detail or statistical significance. To someone who was not a scientist in this field, these results would not be very meaningful.

The second testimonial slide was a better representation on the results. There was greater detail in the information presented in the graph including statistics and the statement had a stronger claim to support the evidence presented. To any scientist or on looker this data is much easier to read and interpret than the first testimonial slide.

Impacts to having assumptions and biases in scientific communication can have negative effects on how that information is communicated and received. In the first testimonial slide, reading it myself I was not able to see the significance of the findings or interpret what those findings even meant based on the way that it was communicated. The second slide was much more effective in terms of identifying and improving communication based on previous assumptions and biases.

**Q3: Identify and briefly the two primary components of a model constructed in the dual model paradigm? Give an example of the two components in the context of a system you are interested in studying.**

The two primary components in a dual model paradigm are deterministic functions and probability distributions. In the Bolker reading, deterministic functions represent the expected behavior of a system in the absence of random variation and probability distributions represent the probable outcomes of random variables. For me it seems like a deterministic is data that is predictable, known data and probability distributions are the random probabilities on an experiment. I would say an example deterministic data in my research would be the data gathered on invasive species (name, species, habitat, range, etc.) since that information is primarily fact and the information I have on climate change is more a kin to probability distributions since at a local level of climate change monitoring, there are different results in many different models resulting in multiple forms of the same data: all of it just shows different probabilities of events in the same area.

**Q4: In 1 - 2 short paragraphs, describe the difference between a statistical and biological or ecological population. Which of these populations may vary depending on the spatial or temporal scale of the research question?**

A biological population is the entire range of a species. For example, all mountain lions that exist would be the biological population of mountain lions. Biological populations are large, meaning that every individual (usually) can’t be measured. A statistical population is a subset of a biological population that is being observed. A biological population does vary depending on spatial scale since it only accounts for the range of a species, however only all currently living species, not every individual that has ever lived. I believe a statistical population would also vary depending on the spatial and temporal scale, the parameters of that population may change.

**Q5: Propose an entity and/or variable in your scenario that you could measure using the data type/scale. Explain why the data type or scale is appropriate for the entity/variable you chose.**

The scenario my group chose was the cattail scenario. In this scenario, two of the main issues were the abundance and species of cattails in the Chesapeake Bay area and species that are being displaced by cattails: native plants, native birds, other native animal species. I think for measuring the abundance and species of cattails I would use a categorical/nominal scale because with this data I want to identify and measure the species of cattail. For the species that are being displaced by the cattail I think I would use categorical/nominal data because I want to know what species are being affected.