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Week 2 Reading Questions

**Q1:**

One of the modeling dichotomies that Bolker mentions is categorized as determining technical details to statistical modeling. Based on our decisions, the model can represent or analyze data in a particular was. A technical dichotomy would be continuous vs discrete techniques. This dichotomy has relevance to my master’s thesis on eastern box turtles. From a continuous data perspective, I might collect data on carapace length or body size, which will be viewed as a continuum. Opposingly, I can collect discrete data in the form of age class or sex, where there will be distinct clusters of data rather than a continuous scale.

**Q2:**

One bias I identified within the quotes was the assumption that everyone subscribes to westernized standards for science, which is a cultural bias.

As evident in the response of the climate change panel to the four testimonies, western science emphasizes statistical significance and empirical support of data. This becomes an issue when western science is discussed in relation to Traditional Ecological Knowledge (TEK). TEK is about understanding the relationships that humans have with nature, while western science is more concerned with explaining the biological processes that make these relationships occur. This biological data is more trustworthy in western science if it can be statistically tested.

Bang et al. 2018 states that western science only values TEK if it has been confirmed by its own standards, thus demonstrating a hierarchy of science. I believe that this bias presents an issue if environmental managers must study a species that is strongly connected to First Nations people. It is likely that western managers will have different management intentions than Indigenous communities. Western science is not objective; it is influenced by culture and circumstance, which does not make it intuitively more valuable than TEK.

**Q3:**

One of the main components of a model constructed in the dual model paradigm is to provide descriptive summaries of the data. Graphs and numerical data are used to measure and represent the current characteristics of a sample population. The distinguishing feature of the descriptive component is that it is not used to make predictions or inferences about the future population or to test hypotheses. In the context of my thesis on eastern box turtle population dynamics, descriptive data would appear in the form of a plot depicting overlapping turtle home ranges based on GPS coordinates taken from radio transmitters.

The second component of the dual model paradigm is for the model to make an inference or prediction about the population. Inferential statistics is also used to compare the results of different models to see if one explanation is more believable as well as testing hypotheses. By estimating the parameters of a statistical model, researchers can predict what population trends could occur in a given circumstance. In the context of the eastern box turtle, I would be interested in modeling the effects of increased prescribed fire in pine barren habitats on box turtle mortality.

**Q4:**

McGarigal defines a population as “the collection of all the possible observations of interest.” This definition is adapted in the contexts of biology and statistics. A biological population refers to all individuals of a particular identity across a large geographic range. In example, this would refer to the total number of Latinx people living in the United States. A statistical population only refers to individuals within a studied group which can be limited in geographic range. An example of this would be if a survey was conducted with the number of Latinx people living in the state of California.

The statistical population can vary depending on the spatial scale of the research question. It is possible for the statistical population to encompass the biological population. However, if the research question is specified, the number of individuals studied may reduce, thus creating the statistical population.

**Q5:**

For the in-class group model thinking activity, My group chose the cattails case study. A categorical variable in this scenario would be the number of cattails found in a North American wetland categorized by species. This data scale is appropriate because multiple cattail species are being studied. One of these species is thought to be non-native, so it is important that the counts are separated and categorized instead of grouping them all into a single count.

Another variable can also be studied in this scenario would be the temperature of a given location recorded in Celsius. This is an example of a numerical variable on an interval scale. This variable is appropriate because temperature is recorded as a number on a scale. In the unit Celsius, temperature can be recorded below zero degrees, which makes it suitable for the interval scale. If temperature was recorded in Kelvin, which cannot drop below absolute zero, that would be a ratio scale.